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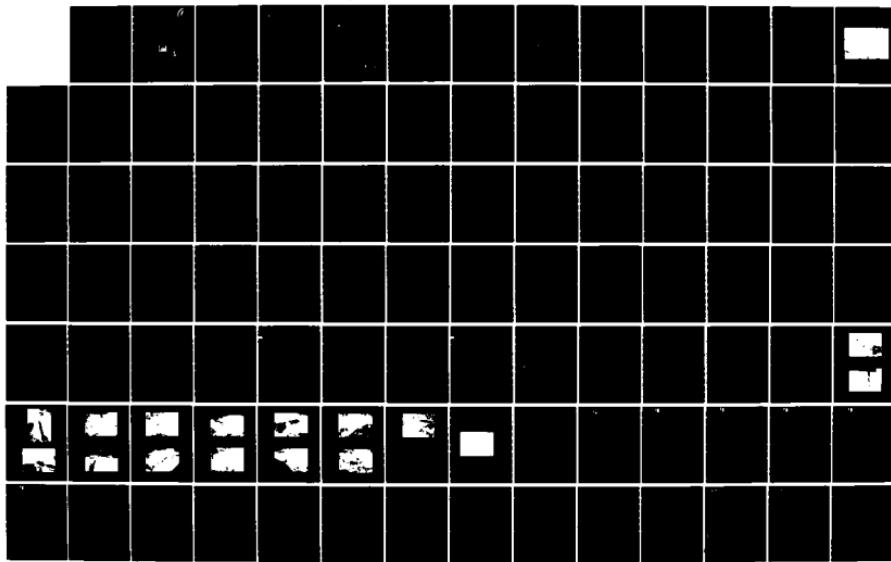
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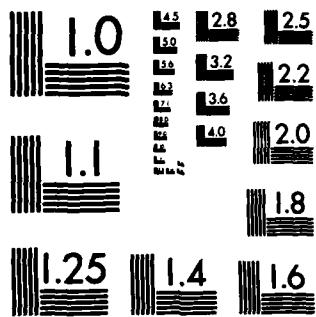
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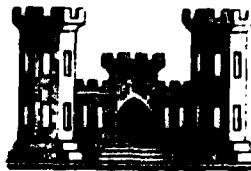
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LOWER Housatonic RIVER BASIN
PLYMOUTH, CONNECTICUT

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WILTON POND DAM
CT-00284

PHASE I INSPECTION REPORT
NATIONAL DAM INSPECTION PROGRAM



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DEPARTMENT OF THE ARMY
NEW ENGLAND DIVISION, CORPS OF ENGINEER
WALTHAM, MASS. 02154

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| 19. KEY WORDS (Continue on reverse side if necessary and identify by block number) DAMS, INSPECTION, DAM SAFETY, Lower Housatonic River Basin Plymouth, Connecticut | | |
| 20. ABSTRACT (Continue on reverse side if necessary and identify by block number) Wilton Pond Dam is a stone masonry structure 42 ft. long with a maximum height of 16 ft. A centrally located depressed spillway section has been grouted and passes water over the dam. There is no outlet works associated with the dam. The dam is judged to be in generally poor condition. For the combination of dam size (small) and downstream hazard (significant) a range in the magnitude of the spillway test flood of 100-year frequency flood to the $\frac{1}{2}$ PMF is given. | | |



DEPARTMENT OF THE ARMY
NEW ENGLAND DIVISION, CORPS OF ENGINEERS
424 TRAPELO ROAD
WALTHAM, MASSACHUSETTS 02154

REPLY TO
ATTENTION OF
NEEDED

JUL 07 1980

Honorable Ella T. Grasso
Governor of the State of Connecticut
State Capitol
Hartford, Connecticut 06115

Dear Governor Grasso:

Inclosed is a copy of the Wilton Pond Dam Phase I Inspection Report, which was prepared under the National Program for Inspection of Non-Federal Dams. This report is presented for your use and is based upon a visual inspection, a review of the past performance and a brief hydrological study of the dam. A brief assessment is included at the beginning of the report. I have approved the report and support the findings and recommendations described in Section 7 and ask that you keep me informed of the actions taken to implement them. This follow-up action is a vitally important part of this program.

A copy of this report has been forwarded to the Department of Environmental Protection, the cooperating agency for the State of Connecticut. In addition, a copy of the report has also been furnished the owner, Town of Plymouth, Terryville, Connecticut 06780.

Copies of this report will be made available to the public, upon request, by this office under the Freedom of Information Act. In the case of this report the release date will be thirty days from the date of this letter.

I wish to take this opportunity to thank you and the Department of Environmental Protection for your cooperation in carrying out this program.

Sincerely,

MAX B. SCHEIDER
Colonel, Corps of Engineers
Division Engineer

Incl
As stated

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WILTON POND DAM

CT 00284



LOWER HOUSATONIC RIVER BASIN

PLYMOUTH, CONNECTICUT

PHASE I INSPECTION REPORT
NATIONAL DAM INSPECTION PROGRAM

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NATIONAL DAM INSPECTION PROGRAM
PHASE I INSPECTION REPORT

Identification No.: CT 00284
Name of Dam: Wilton Pond Dam
Town: Plymouth
County and State: Litchfield, Connecticut
Stream: Nibbling Brook
Date of Inspection: 25 October, 1979

BRIEF ASSESSMENT

Wilton Pond Dam is a stone masonry structure 42 feet long with a maximum height of 16 feet. A centrally located depressed spillway section has been grouted and passes water over the dam. There is no outlet works associated with the dam.

Wilton Pond is used as a fire pond by the Town of Plymouth and functions as a passive recreational area. The lake has a maximum storage volume of 63 acre-feet. The size classification is thus small. A breach of the dam could affect several homes along Carter Road. With the possibility of some loss of life and the probability of serious economic losses, the dam has been classified as having a significant hazard potential.

The dam is judged to be in generally poor condition. Seepage is evident around the right end of the dam exiting through gaps in the stone masonry and the right abutment area. Erosion is taking place on the left abutment and extensive grass cover was noted at the right side of the dam. The recently reconstructed spillway section is in good condition.

For the combination of dam size (small) and downstream hazard (significant) a range in the magnitude of the spillway test flood of 100-year frequency flood to the $\frac{1}{2}$ PMF is given. A spillway test flood of 100-year frequency flood was selected for this project with a test flood inflow of 850 CFS. The maximum spillway capacity is 356 CFS at a stage of 2 feet above the spillway crest (equal to the top of the dam). The capacity of the spillway is inadequate to pass the 100 year storm test flood outflow (631 CFS) without overtopping the dam. The test flood would overtop the dam by about 0.7 feet. The spillway is adequate to pass 42 percent of the test flood outflow without overtopping the dam..

Within one year of receipt of the Phase I Inspection Report, the owner should retain the services of a Qualified Registered

Engineer to: 1) investigate the structural condition of the stone masonry overflow section of the dam and design remedial measures as needed; 2). investigate the seepage on the downstream face of the dam and at the intersection with the right abutment and design appropriate remedial measures; 3) investigate fill material at the right side of the dam and design remedial measures to prevent this section from washout from flood flows; 4) investigate means of dewatering pond in event of emergency or of installing a low level outlet to provide a method of draining the pond; and 5) conduct detailed hydrologic and hydraulic studies to determine the need and means of increasing the project discharge capacity.

The owner should carry out the following operating and maintenance procedures: 1) clear brush and trees from a zone 15 feet wide on each side of the discharge channel for a distance of 100 feet downstream of the dam; 2) establish a monitoring program including documentation of the seepage so that significant changes in flow can be detected; 3) develop a formal surveillance and flood warning plan, with an operational procedure to be followed in the event of an emergency; and 4) institute a program of annual periodic technical inspections.


S. Giavara, P.E.

President

Registered CT. 7634

This Phase I Inspection Report on Wilton Pond Dam has been reviewed by the undersigned Review Board members. In our opinion, the reported findings, conclusions, and recommendations are consistent with the Recommended Guidelines for Safety Inspection of Dams, and with good engineering judgment and practice, and is hereby submitted for approval.



RICHARD DIBUONO, MEMBER
Water Control Branch
Engineering Division



ARAMAST MANTESIAN, MEMBER
Geotechnical Engineering Branch
Engineering Division



CARNEY M. TERZIAN, CHAIRMAN
Design Branch
Engineering Division

APPROVAL RECOMMENDED:



JOE B. PRYOR
Chief, Engineering Division

PREFACE

This report is prepared under guidance contained in the Recommended Guidelines for Safety Inspection of Dams, for Phase I Investigations. Copies of these guidelines may be obtained from the Office of Chief of Engineers, Washington, D.C. 20314. The purpose of a Phase I Investigation is to identify expeditiously those dams which may pose hazards to human life or property. The assessment of the general condition of the dam is based upon available data and visual inspections. Detailed investigation, and analyses involving topographic mapping, subsurface investigations, testing, and detailed computational evaluations are beyond the scope of a Phase I investigation: however, the investigation is intended to identify any need for such studies.

In reviewing this report, it should be realized that the reported condition of the dam is based on observations of field conditions at the time of inspection along with data available to the inspection team. In cases where the reservoir was lowered or drained prior to inspection, such action, while improving the stability and safety of the dam, removes the normal load on the structure and may obscure certain conditions which might otherwise be detectable if inspected under the normal operating environment of the structure.

It is important to note that the condition of a dam depends on numerous and constantly changing internal and external conditions, and is evolutionary in nature. It would be incorrect to assume that the present condition of the dam will continue to represent the condition of the dam at some point in the future. Only through continued care and inspection can there be any chance that unsafe conditions be detected.

Phase I inspections are not intended to provide detailed hydrologic and hydraulic analyses. In accordance with the established Guidelines, the Spillway Test flood is based on the estimated "Probable Maximum Flood" for the region (greatest reasonably possible storm runoff), or fractions thereof. Because of the magnitude and rarity of such a storm event, a finding that a spillway will not pass the test flood should not be interpreted as necessarily posing a highly inadequate condition. The test flood provides a measure of relative spillway capacity and serves as an aide in determining the need for more detailed hydrologic and hydraulic studies, considering the size of the dam, its general condition and the downstream damage potential.

The Phase I Investigation does not include an assessment of the need for fences, gates, no-trespassing signs, repairs to existing fences and railings and other items which may be needed to minimize trespass and provide greater security for the facility and safety to the public. An evaluation of the project for compliance with OSHA rules and regulations is also excluded.

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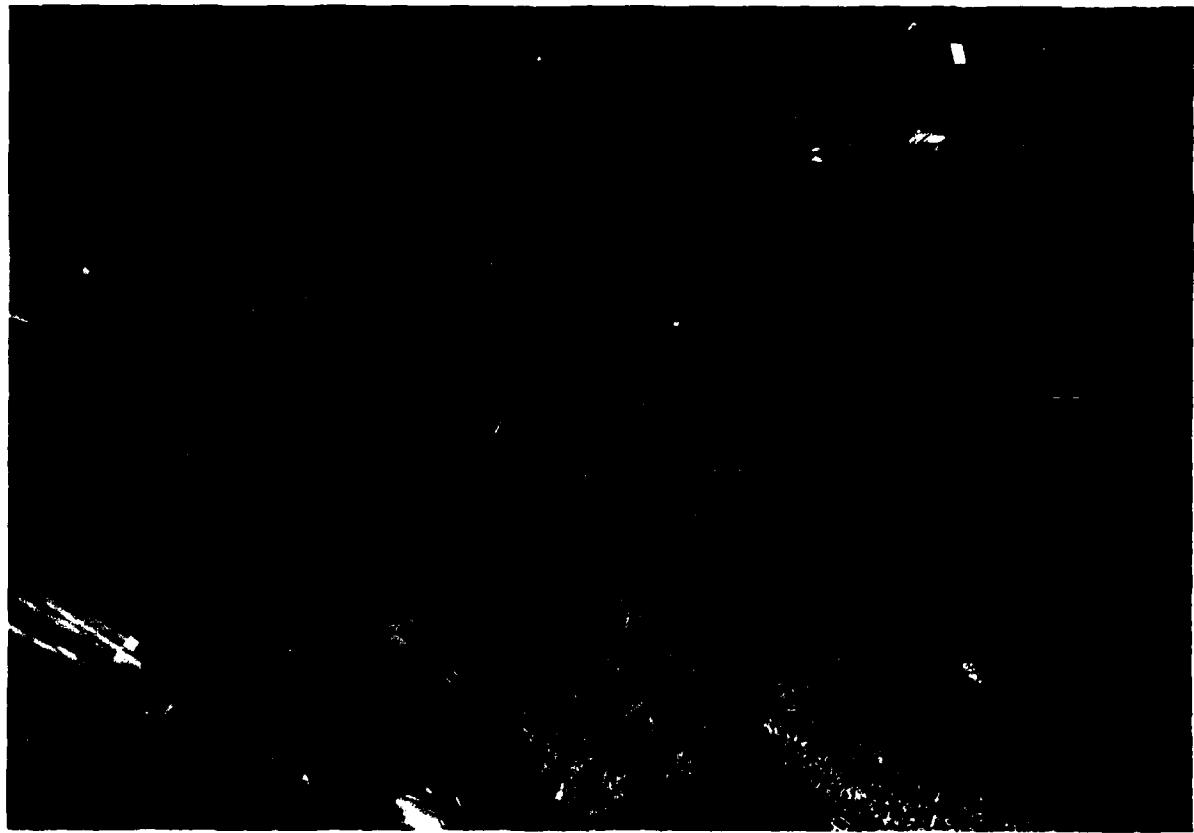
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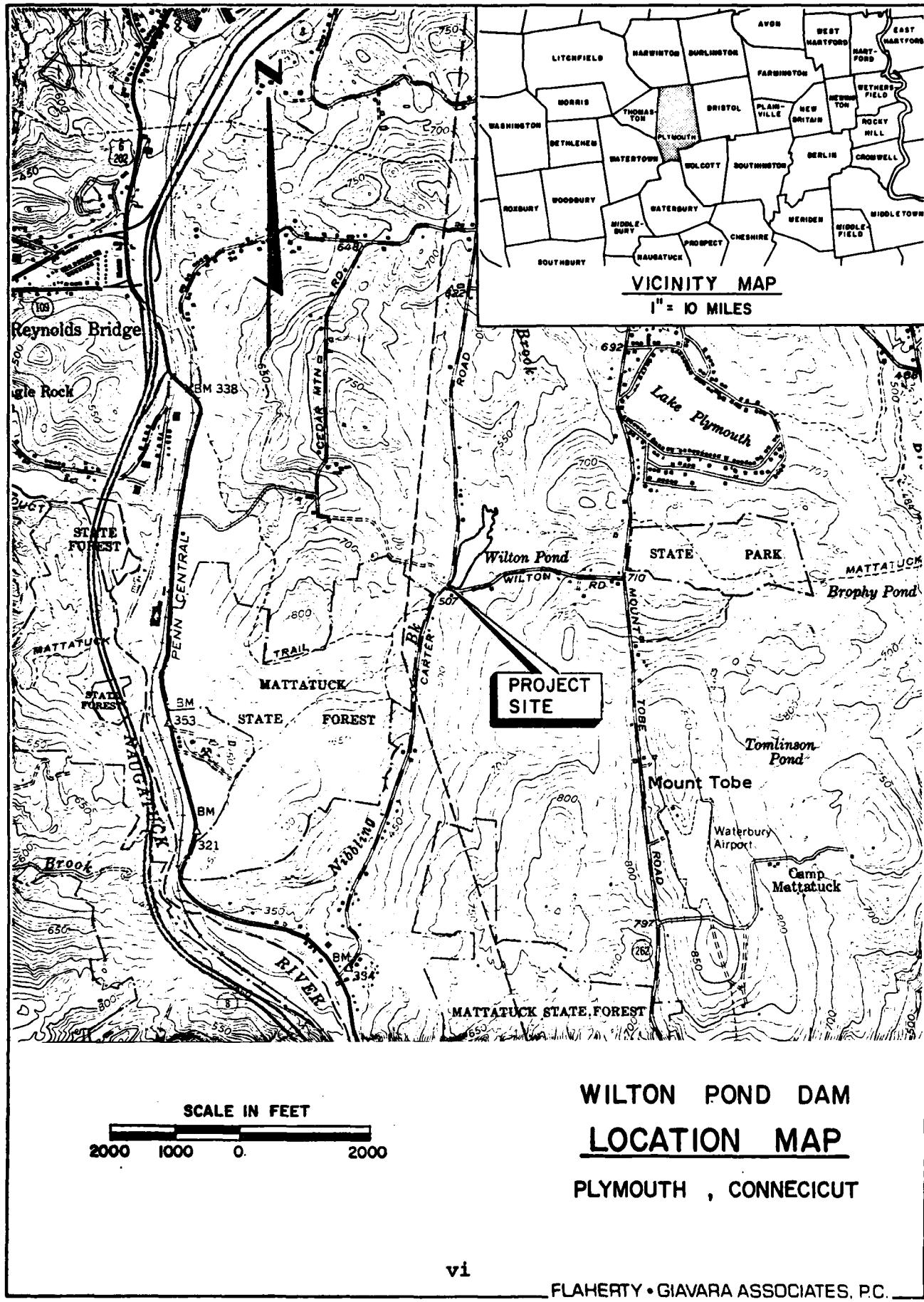
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Overview Photo
Wilton Pond Dam



NATIONAL DAM INSPECTION PROGRAM
PHASE I INSPECTION REPORT
WILTON POND DAM - CT 00284

SECTION 1 - PROJECT INFORMATION

1.1 GENERAL:

a. Authority. Public Law 92-367, August 8, 1972, authorized the Secretary of the Army, through the Corps of Engineers, to initiate a national program of dam inspection through the United States. The New England Division of the Corps of Engineers has been assigned the responsibility of supervising the inspection of dams within the New England Region. Flaherty Giavara Associates, P.C. has been retained by the New England Division to inspect and report on selected dams in the State of Connecticut. Authorization and notice to proceed was issued to Flaherty Giavara Associates, P.C. under a letter of 19 October 1979 from William E. Hodgson, Jr., Colonel, Corps of Engineers. Contract No. DACW33-80-C-0001 has been assigned by the Corps of Engineers for this work.

b. Purpose.

1) Perform technical inspection and evaluation of non-federal dams to identify conditions which threaten the public safety and thus permit correction in a timely manner by non-federal interests.

2) Encourage and assist the States to initiate quickly effective dam safety programs for non-federal dams.

3) To update, verify and complete the National Inventory of Dams.

1.2 DESCRIPTION OF THE PROJECT:

a. Location. The Wilton Pond Dam is located in Plymouth, Connecticut on Nibbling Brook. The pond is located approximately 2 miles south of the center of Plymouth. The reservoir is shown on the U.S.G.S. Topographic Map "Thomaston, Connecticut" at a latitude of $41^{\circ}38'40''$ and a longitude of $73^{\circ}4'33''$. The Location Map on page vi shows the location of the structure.

b. Description of Dam and Appurtenances. Wilton Pond Dam is a stone masonry dam 42 feet in length and 16 feet in height. The crest elevation of the dam and spillway is 504 feet. The left and right spillway walls consist of recent concrete grout cap 18-24 inches in height. The walls have upstream and downstream slopes of 1 horizontal to 1 vertical with a rounded

crest. The maximum elevation of these walls is 506 feet. The downstream face of the stone masonry portion of the dam is vertical.

The entire length of the masonry dam functions as the spillway. Normal flows are confined to a 2 foot wide depressed section at the center of the dam. The crest of the spillway consists of a concrete slab over the existing stone masonry.

No functioning outlet works are known to exist or were observed at this dam. Previous engineering inspection reports (Appendix B) refer to a possible "old flume" located between the right (west) abutment and Carter Road.

c. Size Classification. Wilton Pond Dam has a storage volume of 63 acre-feet and a height of 16 feet. Storage of less than 1,000 acre-feet and a height of less than 40 feet classifies this structure in the "small" category according to guidelines established by the Corps of Engineers.

d. Hazard Classification. The dam is classified as having a "significant" hazard potential. The probable impact area would be shallow flooding of approximately 7 residential dwellings on Carter Road. This roadway parallels Nibbling Brook downstream of the dam. Approximately 6,000 feet downstream of the dam Nibbling Brook joins the Naugatuck River. With the possibility of some loss of life and the probability of serious economic losses, the dam has been classified as having a significant hazard potential.

e. Ownership. The dam is presently owned by the Town of Plymouth, 19 East Main Street, Terryville, Connecticut, telephone: 203-589-6330. The previous owner of the dam was the Kaabans Shrine Club.

f. Operator. The operator of this dam is the Director of Public Works, Town of Plymouth, telephone: 203-589-6330.

g. Purpose of Dam. The Town of Plymouth uses the pond for an emergency water source for fire protection. The pond also functions as a passive recreational area.

h. Design and Construction History. There is no design or construction information pertaining to the original dam structure. Previous inspection of early topographic maps indicate that the dam existed as of 1890; however, the exact construction date is unknown. Several dam repairs have been documented since 1960. In 1965 a washed out area 4 feet high, 4 feet wide, and 2 feet deep at the west downstream face was repaired by replacing and mortaring the masonry stones. In addition, a concrete cap was added to the spillway crest and concrete was placed at the upstream face of the dam. A Certificate of Approval was issued for this repair work on October 21, 1965 by the Connecticut Water Resources Commission. In September and October of 1978

additional repair work was completed at the dam. An eroded area between the west abutment and Carter Road was backfilled with blasted rock 2-3 feet in diameter. The stone masonry upstream face was gunited to a depth about 5 feet below the spillway crest. In addition, concrete grout walls 18-24 inches high were constructed on the westerly side of the dam from the spillway to the upstream bridge abutment and on the easterly side of the dam from the spillway to existing ground. This work was designed by C.E. Maguire, Inc., New Britain, Connecticut and constructed by King Contractors Limited and Northeast Gunite and Grouting, Inc.

i. Normal Operation Procedures. There are no outlet works at the dam; therefore, all water is wasted over the spillway.

1.3 PERTINENT DATA:

a. Drainage Area. The drainage area of Wilton Pond is 1.3 square miles. The watershed is wooded upland terrain with scattered residential development. Sutliffe Brook enters Wilton Pond from the north and an unnamed watercourse from Brophy Pond to the east.

b. Discharge at Dam Site.

1) There are no visible outlet works located at this dam. Previous engineering inspection reports (Appendix B) refer to a possible "old flume" located between the west abutment and Carter Road. This area has since been filled with blasted rock.

2) There are no known records of past floods or flood stage heights at the dam.

3) The ungated spillway capacity at the top of dam - 356 CFS @ El. 506.

4) The ungated spillway capacity at test flood elevation - 559 CFS @ El. 506.7.

5) The gated spillway capacity at normal pool elevation is not applicable at this dam.

6) The gated spillway capacity at test flood elevation is not applicable at this dam.

7) The total spillway capacity at test flood elevation - 559 CFS @ El. 506.7.

8) The total project discharge at the top of dam elevation - equivalent to the spillway capacity of 356 CFS @ El. 506.

9) The total project discharge at test flood elevation - 631 CFS @ 506.7.

c. Elevation. (NGVD)

| | |
|-------------------------------------|---------|
| 1) Streambed at toe of dam..... | 490 |
| 2) Bottom of cut-off..... | Unknown |
| 3) Maximum tailwater..... | N/A |
| 4) Recreation pool..... | N/A |
| 5) Full flood control pool..... | N/A |
| 6) Spillway crest..... | 504 |
| 7) Design surcharge..... | Unknown |
| 8) Top of dam..... | 506 |
| 9) Test flood design surcharge..... | 506.7 |

d. Reservoir. (Length in feet)

| | |
|-----------------------------|------|
| 1) Normal pool..... | 1350 |
| 2) Flood control pool..... | N/A |
| 3) Spillway crest pool..... | 1350 |
| 4) Top of dam..... | 1500 |
| 5) Test flood pool..... | 1550 |

e. Storage. (acre-feet)

| | |
|-----------------------------|-----|
| 1) Normal pool..... | 42 |
| 2) Flood control pool..... | N/A |
| 3) Spillway crest pool..... | 42 |
| 4) Top of dam..... | 63 |
| 5) Test flood pool..... | 70 |

f. Reservoir Surface. (acres)

| | |
|----------------------------|-----|
| 1) Normal pool..... | 8.4 |
| 2) Flood-control pool..... | N/A |

- 3) Spillway crest.....8.4
- 4) Test flood pool.....11.8
- 5) Top of dam.....11.5

g. Dam.

- 1) Type: Stone masonry
- 2) Length: 42 feet
- 3) Height: 16 feet
- 4) Top Width: 3 feet
- 5) Side Slopes: Downstream: vertical.
- 6) Zoning: Unknown
- 7) Impervious Core: Unknown
- 8) Cut-off: Unknown
- 9) Grout curtain: Unknown

h. Diversion and Regulating Tunnel.

- 1) Type: Not applicable
- 2) Length: Not applicable
- 3) Closure: Not applicable
- 4) Access: Not applicable
- 5) Regulating Facilities: Not applicable

i. Spillway.

- 1) Type: Broad crested stone masonry.
- 2) Length of weir: 42 feet
- 3) Crest elevation: 504
- 4) Gates: None
- 5) U/S Channel: Reservoir
- 6) D/S Channel: Natural bedrock, boulder channel.

j. Regulating Outlets. None.

SECTION 2 - ENGINEERING DATA

2.1 DESIGN:

No data on the design of the dam and its original appurtenances have been recovered and probably none exist.

2.2 CONSTRUCTION:

No information was recovered regarding construction of the dam. Recent repairs have consisted of construction of spillway wall on the westerly side of the dam from the top of the spillway extending in a northerly direction to the downstream face of Wilton Road bridge abutment; construction of a wall on the easterly side of the dam extending from the top of the spillway easterly to the left (east) abutment; guniting of the crest of the dam.

2.3 OPERATION DATA:

Formal operational records are not available for this dam.

2.4 EVALUATION:

a. Availability. Only minimal engineering information is available for this dam. There are no plans, specifications or computations available for the original construction.

b. Adequacy. The lack of in-depth engineering data did not allow for a definitive review. Therefore, the adequacy of this dam could not be assessed from the standpoint of reviewing design and construction data, but is based primarily on visual inspection, past performance and sound engineering judgement.

c. Validity. There is no reason to question the validity of the available data.

SECTION 3 - VISUAL INSPECTION

3.1 FINDINGS:

a. General. Based on visual inspection, history and general history, the Wilton Pond Dam and its appurtenances are judged to be in poor condition. The dam consists of a stone masonry wall about 16 feet high with earth fill on the upstream face. The central portion of the dam is a notched spillway built into the stone wall. The lip of the spillway has recently been raised to increase capacity and minimize flow passing over the non-flow portion of the dam. A recently constructed grout cap is in place over the dry stone masonry and is in good condition. The vertical and horizontal alignment of the dam is good. Seepage is evident around the right (west) end of dam exiting through gaps in the stone masonry and out of the right (west) abutment. Some erosion was noted adjacent to the left (east) abutment. Extensive grass cover was observed on the downstream slope of the right (west) side of the dam.

b. Dam. Extensive seepage is occurring between the stone blocks across the front face of the dam as indicated in Photo No. 2, Photo No. 5, Photo No. 7, Photo No. 9, and Photo No. 10. Gunite repairs have been made to the crest and adjacent to the right and left abutments as indicated in Photo No. 1.

Seepage is occurring at the contact with the right abutment as shown in Photo No. 14 and Photo No. 15. A washout may have developed at this contact according to a sketch prepared by Macchi in 1963. The contact area contains many large boulders and rocks which were dumped adjacent to the abutment (Photo No. 8). The correspondence reviewed (Appendix B) indicated that the rock waste was obtained from a rock excavation north of the dam on Carter Road and ranged up to 2 to 3 ft. dia. The dumped rock area has become grassed over and at the time of the visual inspection the grass cover obscured the presence of the large blocks of blasted rock.

The left side of the dam is in contact with a massive outcrop of bedrock. No evidence of seepage was observed at this contact at the time of the field inspection.

1) Spillway - Water discharges over the central portion of the stone masonry dam as indicated in Photo No. 3 and Photo No. 6. The crest of the overflow section has received a recent grout cap over the stone masonry blocks, and is in good condition. An 18 to 24 inch lip contains the spillway flow (Photo No. 4 and Photo No. 11). The Wilton Road bridge restricts flow to the dam spillway (see Photo No. 13).

c. Appurtenant Structures. There are no known low level outlet works for this structure. Correspondence indicates there is "a possible old flume (now leaking)" passing through the dam. The location of this structure is unknown. (See Appendix B, letter to Mr. V. Galgowski from J. Luchs, Jr. dated June 9, 1975.)

d. Reservoir Area. The perimeter of Wilton Pond consists of a town road (Carter Road) on its west side, and moderate sloping wooded terrain on the north and east sides. All slopes appear to be stable. There is no evidence of slides or sloughing (see Photo No. 16). Sediment bars are forming at the northern end of the pond, and are supporting wetland species of vegetation.

e. Downstream Channel. The spillway discharges directly into a natural channel that is generally 10 to 15 feet wide. Bedrock is exposed along portions of the channel bottom and banks, with the remaining areas dominated by cobbles and gravel. The channel slopes are wooded on the east side, and are a combination of natural woods and grassed fill areas on the west side (Photo No. 12).

3.2 EVALUATION:

Based on the visual inspection, the condition of the dam is considered to be poor. The inspection disclosed the following items which require attention:

a. Seepage is occurring at many locations on the downstream face of the stone masonry dam and at the contact with the right (west) abutment. This condition will affect the long-term performance of the dam if not corrected.

b. The contact area with the right (west) abutment is protected from overtopping by an 18-in.-high gunite spillway training wall. It is anticipated that this section of the abutment will be eroded if the upstream gunite training wall is overtopped.

SECTION 4 - OPERATIONAL AND MAINTENANCE PROCEDURES

4.1 OPERATIONAL PROCEDURES:

a. General. Since there is no outlet structure for the dam, the water level impounded by Wilton Pond Dam cannot be controlled and no formal operational procedures are followed.

b. Description of any Warning System in Effect. There is no warning system of any kind in effect at the dam. There are no formal emergency operation plans in effect for lowering the water level in anticipation of severe storms.

4.2 MAINTENANCE PROCEDURES:

a. General. Maintenance of the dam appears to be generally lacking.

b. Operating Facilities. There are no operating facilities at the dam.

4.3 EVALUATION:

Regular operational maintenance for this dam and its appurtenances has not been developed or implemented. In view of the apparent lack of drawdown capability at the dam, it is imperative that the owner make arrangements to obtain the services of a qualified registered engineer to develop methods of obtaining a low level outlet for the dam.

An emergency action plan should be prepared to prevent or minimize the impact of failure. This plan should list the expedient action to be taken and authorities to be contacted.

SECTION 5 - EVALUATION OF HYDRAULIC/HYDROLOGIC FEATURES

5.1 GENERAL DATA:

The Wilton Pond Dam is a stone masonry structure with a grouted concrete cap along its crest at the overflow spillway section. The left (east) abutment is natural ground with exposed bedrock, on the right (west) side a broad embankment of fill material has been constructed. The dam discharges over a depressed 42 foot wide spillway section at its crest.

The watershed consists of 1.3 square miles of upland terrain that is well wooded. Only about 5 percent of the watershed consists of upstream ponds that could provide storage and affect downstream runoff rates.

5.2 DESIGN DATA:

There is no known specific design data available relative to this dam. The hydraulic/hydrologic information used in this report is entirely from the field inspection measurements and U.S.G.S. topographic maps (scale 1" = 2000').

5.3 EXPERIENCE DATA:

The only documented information pertaining to previous flow conditions is contained in a November 7, 1963 letter from the Connecticut Water Resources Commission to Kaabans Shrine Club, indicating that a part of the right (western) embankment had been washed out previous to that date. The cause of the failure is unknown.

5.4 TEST FLOOD ANALYSIS:

The test flood for determining the spillway adequacy is based upon COE guidelines. The size classification of the dam is "small" based upon a height of 16 feet and storage volume of 63 acre-feet. The hazard potential is "significant" due to the residential land use downstream of the dam within the flood hazard area determined from dam failure analysis. The spillway test flood required by COE guidelines for this size dam and hazard potential can range from the 100 year frequency flood to the $\frac{1}{2}$ probable maximum flood.

The spillway test flood selected for this project is the 100 year frequency flood, due to the possibility of some loss of life and the probability of economic loss due to dam failure, and the relatively small size of the dam and reservoir.

The magnitude of the spillway test flood was developed using the Soil Conservation Service method for determining flow rates as described in the publication entitled "Design of Small Dams" by the Bureau of Reclamation (see Appendix D). The watershed is a rolling wooded upland, with minimal floodwater storage areas in natural wetlands and impoundments.

Two different rainfall durations were evaluated due to the small watershed size, with the one hour duration storm determined to be the most critical condition.

The maximum spillway capacity is 356 CFS at a stage of 2 feet above the spillway crest (equal to the top of the dam).

The spillway test flood was formed into a triangular hydrograph with a peak inflow of 850 CFS and a runoff duration of 2.4 hours. The runoff duration was selected so that the triangular hydrograph would contain the same volume of water as the estimated storm runoff.

The hydrograph was routed through the reservoir using a computer program based on stage-storage and stage-discharge data. The reservoir was assumed to be full and level with the spillway prior to the storm event. The results of the flood routing procedures indicate that the spillway test flood peak inflow rate of 850 CFS is reduced to a peak outflow rate of 631 CFS by the storage in the reservoir. Therefore, the spillway can pass 42% of the spillway test flood outflow without overtopping the dam.

The peak flood stage at the spillway is at elevation 506.7, which is 0.7 feet above the crest of the dam. The duration of the overflow is approximately 1 hour.

5.5 DAM FAILURE ANALYSIS:

The downstream impact of a dam failure was analyzed using the COE "Rule of Thumb Guidance for Estimating Downstream Dam Failure Hydrographs" dated April, 1978.

Based upon an assumed breach width of 28 feet, equal to 40% of the dam's width at mid-height, the peak flood flow due to failure would be 3367 CFS. The base flow is negligible due to the small watershed.

Using topographic data from U.S.G.S. maps (scale 1" = 2000'), the evaluation indicates that the dam failure floodwave would move rapidly down the steep valley of Nibbling Brook, and then spread out laterally on the broad Naugatuck River floodplain.

The probable impact area is a rural-residential area, including

Carter Road which would be subject to shallow flooding. It is estimated that 7 houses would be subjected to about 3 feet of flooding above ground level (2 feet above sill). There is the potential for loss of a few lives and appreciable economic loss and therefore the dam has been classified as having a significant hazard potential.

SECTION 6 - EVALUATION OF STRUCTURAL STABILITY

6.1 VISUAL OBSERVATION:

The visual observations did not disclose any evidence of present structural instability of the dry-stone masonry spillway section of the dam. Extensive seepage at the face of the dam and at the contact with right abutment indicates that future instability of these sections may develop. Based on the visual inspection alone it is not possible to determine the character of the dam foundation or the interior of the cross section or the shape of the upstream face below the level of water in the reservoir against the dam. Therefore, it is not possible to evaluate the factor of safety of the dam against slope failure, sliding or overturning.

6.2 DESIGN AND CONSTRUCTION DATA:

No design or construction data pertinent to the structural stability of the dam were disclosed.

6.3 POST-CONSTRUCTION CHANGES:

A sketch prepared by Macchi Structural Engineers in November 1963 indicated that a portion of the right abutment may have been washed out and subsequently repaired at some time prior to this period. No other information concerning this event was noted during a review of the available files.

The visual inspection disclosed that portions of the crest, upstream face and upstream spillway training walls had received a gunite treatment. According to the available correspondence (Appendix B) this remedial work was performed in 1977 and 1978. No other records pertinent to post-construction changes were disclosed.

6.4 SEISMIC STABILITY:

Wilton Pond Dam is located in Seismic Zone 1 and, in accordance with the recommended Phase I guidelines, does not warrant seismic analysis.

SECTION 7 - ASSESSMENT, RECOMMENDATIONS AND REMEDIAL MEASURES

7.1 DAM ASSESSMENT:

a. Condition. A visual inspection and review of available information indicates that Wilton Pond Dam is in poor condition. Extensive seepage at the face of the dam and at the contact with the right abutment was noted.

The capacity of the spillway is inadequate to pass the 100 year storm test flood outflow of 631 CFS without overtopping the dam. The test flood would overtop the dam by about 0.7 ft. The spillway is adequate to pass 42 percent of the test flood outflow without overtopping the dam.

b. Adequacy of Information. The information available is such that the assessment of the dam must be based primarily on the visual inspection.

c. Urgency. The recommendations made in Sections 7.2 and 7.3 should be implemented by the owner within one year after receipt of the Phase I report.

7.2 RECOMMENDATIONS:

The owner should retain the services of a qualified professional engineer qualified in the design and inspection of dams to accomplish the following:

a. Investigate the structural condition of the stone masonry overflow section of the dam and design remedial measures as needed. Determine the maximum height that water should be allowed to pass over the spillway.

b. Investigate the seepage on the downstream face of the dam and at the intersection with the right abutment. Design and implement appropriate remedial measures.

c. Investigate the character of fill material at the contact of the dam with the right abutment. Design remedial measures to prevent this section from washout if the right upstream gunite training walls are overtopped during a period of peak flow.

d. Investigate means of dewatering pond in event of emergency or of installing a low level outlet to provide a method for draining the pond.

e. Conduct detailed hydrologic and hydraulic studies to determine the need for and means of increasing the project discharge capacity.

The owner should carry out the recommendations made by the engineer.

7.3 REMEDIAL MEASURES:

a. Operating and Maintenance Procedures. The owner should:

1) Clear brush and trees from a zone 15 ft. wide on each side of the discharge channel for a distance of 100 feet downstream of the dam.

2) Remove logs and debris from discharge channel.

3) Establish a monitoring program including observation and documentation of the seepage so that significant changes in flow can be detected. This inspection should be performed at both high and low reservoir levels and should be continued until the recommendations in 7.2 have been carried out.

4) Develop a formal surveillance and flood warning plan, with an operational procedure to be followed in the event of an emergency.

5) Institute a program of annual periodic inspections.

7.4 ALTERNATIVES:

There are no practical alternatives to the recommendations presented in 7.2 and 7.3.

APPENDIX A

INSPECTION CHECK LIST

INSPECTION CHECK LIST

PARTY ORGANIZATION

PROJECT Wilton Pond Dam DATE Oct. 25, 1979
TIME 1330
WEATHER Clear, 50°F
W.S. ELEV. U.S. DN.S.

PARTY:

1. R. Smith, FGA, Project Manager
2. J. MacBroom, FGA, Hydraulics/Hydrology
3. R. Murdock, GEI, Geotechnical
4.
5.

| PROJECT FEATURE | INSPECTED BY | REMARKS |
|-----------------|--------------|-----------|
| 1. <u> </u> | <u> </u> | <u> </u> |
| 2. <u> </u> | <u> </u> | <u> </u> |
| 3. <u> </u> | <u> </u> | <u> </u> |
| 4. <u> </u> | <u> </u> | <u> </u> |
| 5. <u> </u> | <u> </u> | <u> </u> |
| 6. <u> </u> | <u> </u> | <u> </u> |
| 7. <u> </u> | <u> </u> | <u> </u> |
| 8. <u> </u> | <u> </u> | <u> </u> |
| 9. <u> </u> | <u> </u> | <u> </u> |
| 10. <u> </u> | <u> </u> | <u> </u> |

PERIODIC INSPECTION CHECK LIST
NATIONAL DAM INSPECTION PROGRAM

DAM: Wilton Pond Dam DATE: Oct. 25, 1979

| AREA EVALUATED | CONDITIONS |
|---|--|
| <u>DAM EMBANKMENT</u> | |
| Crest Elevation | |
| Current Pool Elevation | |
| Maximum Impoundment to Date | |
| Surface Cracks | None observed. |
| Pavement Condition | Grass on right side of dam. |
| Movement or Settlement of Crest | None observed. |
| Lateral Movement | None observed. |
| Vertical Alignment | Good. |
| Horizontal Alignment | Good. |
| Condition at Abutment and at Concrete Structures | Seepage evident around right side of dam, exiting through the stone masonry. |
| Indications of Movement of Structural Items on Slopes | None. |
| Trespassing on Slopes | Large boulders were located along the right side of dam. |
| Sloughing or Erosion of Slopes or Abutments | Some erosion adjacent to the left abutment. |
| Rock Slope Protection - Riprap Failures | Concrete faced upstream. |
| Unusual Movement or Cracking at or near Toes | None. |
| Unusual Embankment or Downstream Seepage | Extensive seepage flowing between the stone masonry blocks. |
| Piping or Boils | None observed. |
| Foundation Drainage Features | None. |
| Toe Drains | None. |
| Instrumentation System | None. |
| Vegetation | Extensive grass cover on the downstream slope of the right side of the dam. |

PERIODIC INSPECTION CHECK LIST
NATIONAL DAM INSPECTION PROGRAM

DAM: Wilton Pond Dam

DATE: Oct. 25, 1979

| AREA EVALUATED | CONDITIONS |
|--|-----------------|
| <u>DIKE EMBANKMENT</u> Crest Elevation Current Pool Elevation Maximum Impoundment to Date Surface Cracks Pavement Condition Movement or Settlement of Crest Lateral Movement Vertical Alignment Horizontal Alignment Condition at Abutment and at Concrete Structures Indications of Movement of Structural Items on Slopes Trespassing on Slopes Sloughing or Erosion of Slopes or Abutments Rock Slope Protection - Riprap Failures Unusual Movement or Cracking at or near Toes Unusual Embankment or Downstream Seepage Piping or Boils Foundation Drainage Features Toe Drains Instrumentation System Vegetation | Not applicable. |

PERIODIC INSPECTION CHECK LIST
NATIONAL DAM INSPECTION PROGRAM

DAM: Wilton Pond Dam DATE: Oct. 25, 1979

| AREA EVALUATED | CONDITIONS |
|---|-----------------|
| <p><u>OUTLET WORKS - INTAKE</u> <u>CHANNEL AND INTAKE</u> <u>STRUCTURE</u></p> <p>a. Approach Channel</p> <p>Slope Conditions</p> <p>Bottom Conditions</p> <p>Rock Slides or Falls</p> <p>Log Boom</p> <p>Debris</p> <p>Condition of Concrete Lining</p> <p>Drains or Weep Holes</p> <p>b. Intake Structure</p> <p>Condition of Concrete</p> <p>Stop Logs and Slots</p> | Not applicable. |

PERIODIC INSPECTION CHECK LIST
NATIONAL DAM INSPECTION PROGRAM

DAM: Wilton Pond Dam

DATE: Oct. 25, 1979

| AREA EVALUATED | CONDITIONS |
|--|-----------------|
| <u>OUTLET WORKS - CONTROL TOWER</u> | Not applicable. |
| a. Concrete and Structural | |
| General Condition | |
| Condition of Joints | |
| Spalling | |
| Visible Reinforcing | |
| Rusting or Staining of Concrete | |
| Any Seepage or Efflorescence | |
| Joint Alignment | |
| Unusual Seepage or Leaks in Gate Chamber | |
| Cracks | |
| Rusting or Corrosion of Steel | |
| b. Mechanical and Electrical | |
| Air Vents | |
| Float Wells | |
| Crane Hoist | |
| Elevator | |
| Hydraulic System | |
| Service Gates | |
| Emergency Gates | |
| Lightning Protection System | |
| Emergency Power System | |
| Wiring and Lighting System in Gate Chamber | |

PERIODIC INSPECTION CHECK LIST
NATIONAL DAM INSPECTION PROGRAM

DAM: Wilton Pond Dam DATE: Oct. 25, 1979

| AREA EVALUATED | CONDITIONS |
|---|-----------------|
| <u>OUTLET WORKS - TRANSITION AND CONDUIT</u> General Condition of Concrete Rust or Staining on Concrete Spalling Erosion or Cavitation Cracking Alignment of Monoliths Alignment of Joints Numbering of Monoliths | Not applicable. |

PERIODIC INSPECTION CHECK LIST
NATIONAL DAM INSPECTION PROGRAM

DAM: Wilton Pond Dam DATE: Oct. 25, 1979

| AREA EVALUATED | CONDITIONS |
|--|-----------------|
| <u>OUTLET WORKS - OUTLET</u> <u>STRUCTURE AND OUTLET</u> <u>CHANNEL</u> General Condition of Concrete Rust or Staining Spalling Erosion or Cavitation Visible Reinforcing Any Seepage or Efflorescence Condition at Joints Drain Holes Channel Loose Rock or Trees Overhanging Channel Condition of Discharge Channel | Not applicable. |

PERIODIC INSPECTION CHECK LIST
NATIONAL DAM INSPECTION PROGRAM

DAM: Wilton Pond Dam DATE: Oct. 25, 1979

| AREA EVALUATED | CONDITIONS |
|--|--|
| <u>OUTLET WORKS - SPILLWAY WEIR</u> | |
| <u>APPROACH AND DISCHARGE CHANNELS</u> | |
| a. Approach Channel | Underwater - upstream face of the dam. |
| General Condition | |
| Loose Rock Overhanging Channel | |
| Trees Overhanging Channel | |
| Floor of Approach Channel | |
| b. Weir and Training Walls | |
| General Condition of Concrete | |
| Rust or Staining | |
| Spalling | |
| Any Visible Reinforcing | |
| Any Seepage or Efflorescence | |
| Drain Holes | None observed. |
| c. Discharge Channel | |
| General Condition | Natural channel, bedrock evident on both right and left hand sides of channel. |
| Loose Rock Overhanging Channel | |
| Trees Overhanging Channel | On both sides of channel. |
| Floor of Channel | Bedrock surface. |
| Other Obstructions | Logs and debris noted along the channel bottom. |

PERIODIC INSPECTION CHECK LIST
NATIONAL DAM INSPECTION PROGRAM

DAM: Wilton Pond Dam DATE: Oct. 25, 1979

| AREA EVALUATED | CONDITIONS |
|--|-----------------|
| <u>OUTLET WORKS - SERVICE BRIDGE</u> a. Superstructure Bearings Anchor Bolts Bridge Seat Longitudinal Members Under Side of Deck Secondary Bracing Deck Drainage System Railings Expansion Joints Paint b. Abutment & Piers General Condition of Concrete Alignment of Abutment Approach to Bridge Condition of Seat and Backwall | Not applicable. |

APPENDIX B

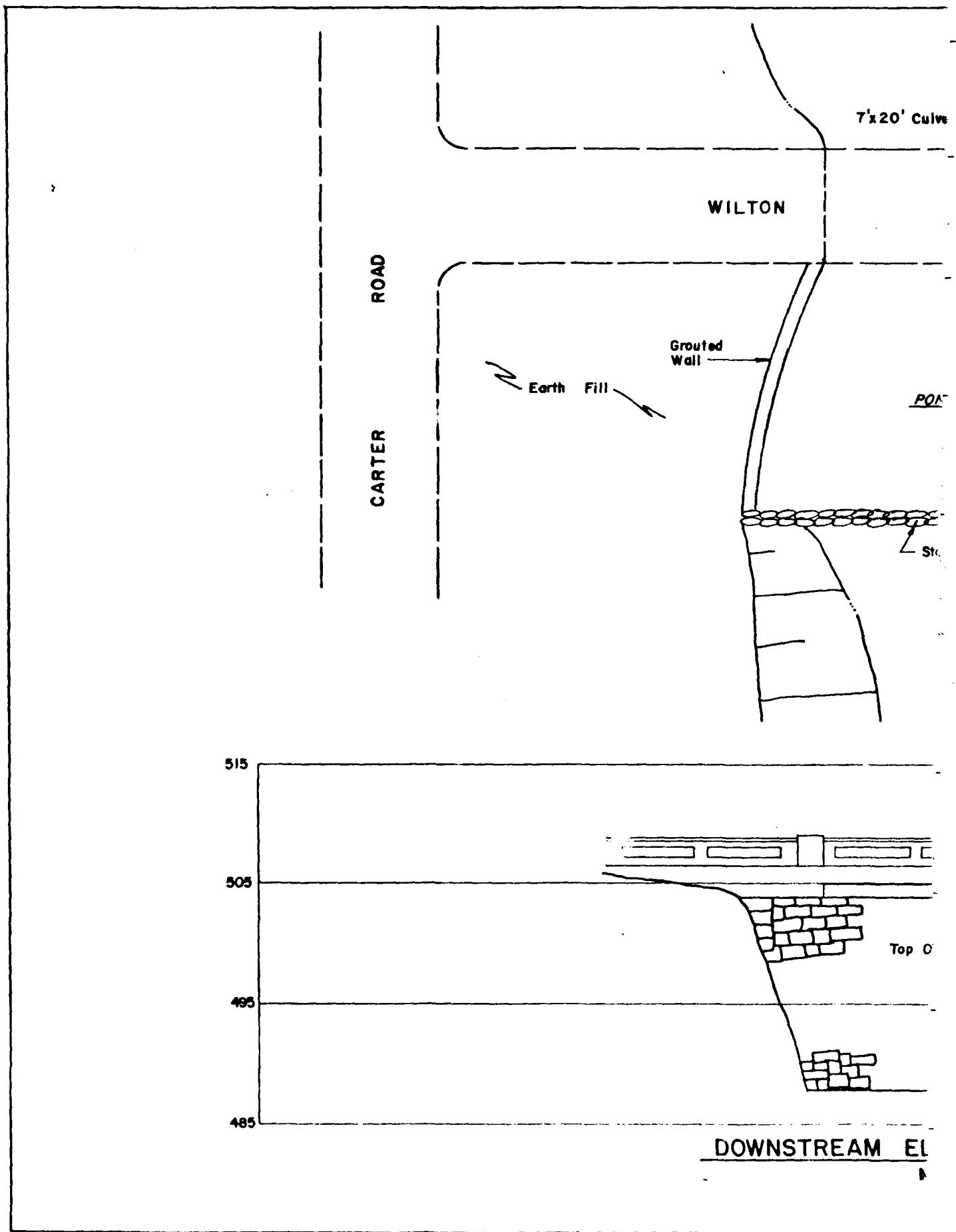
ENGINEERING DATA

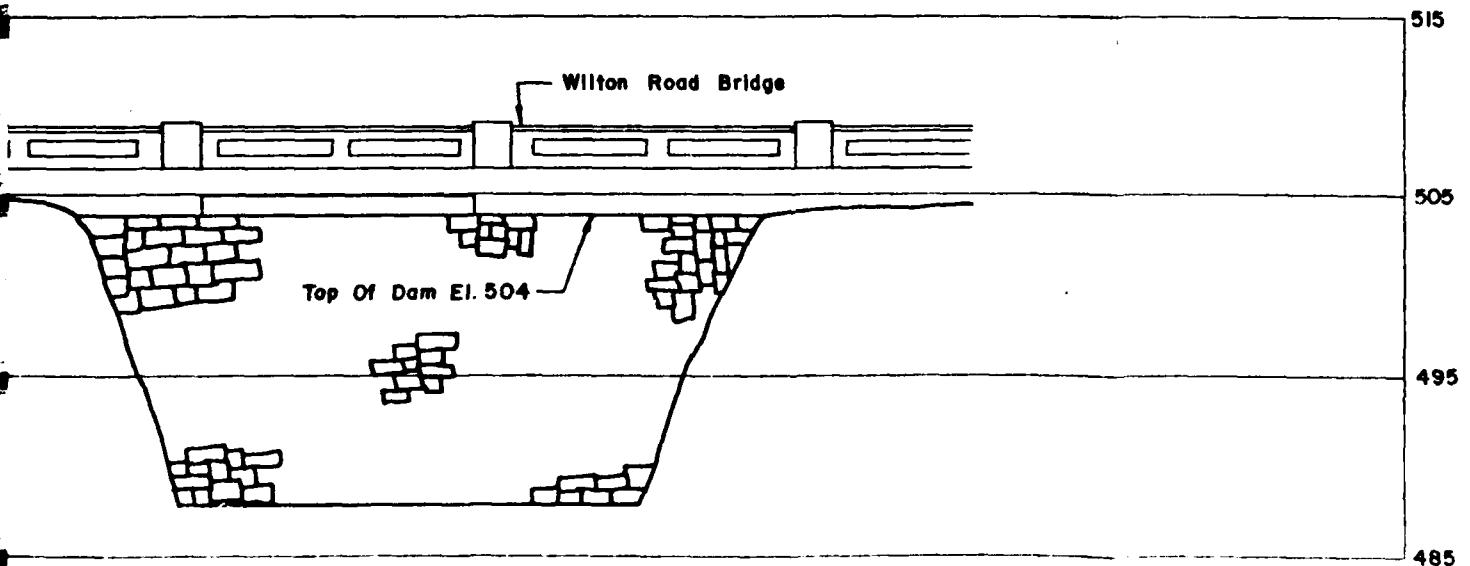
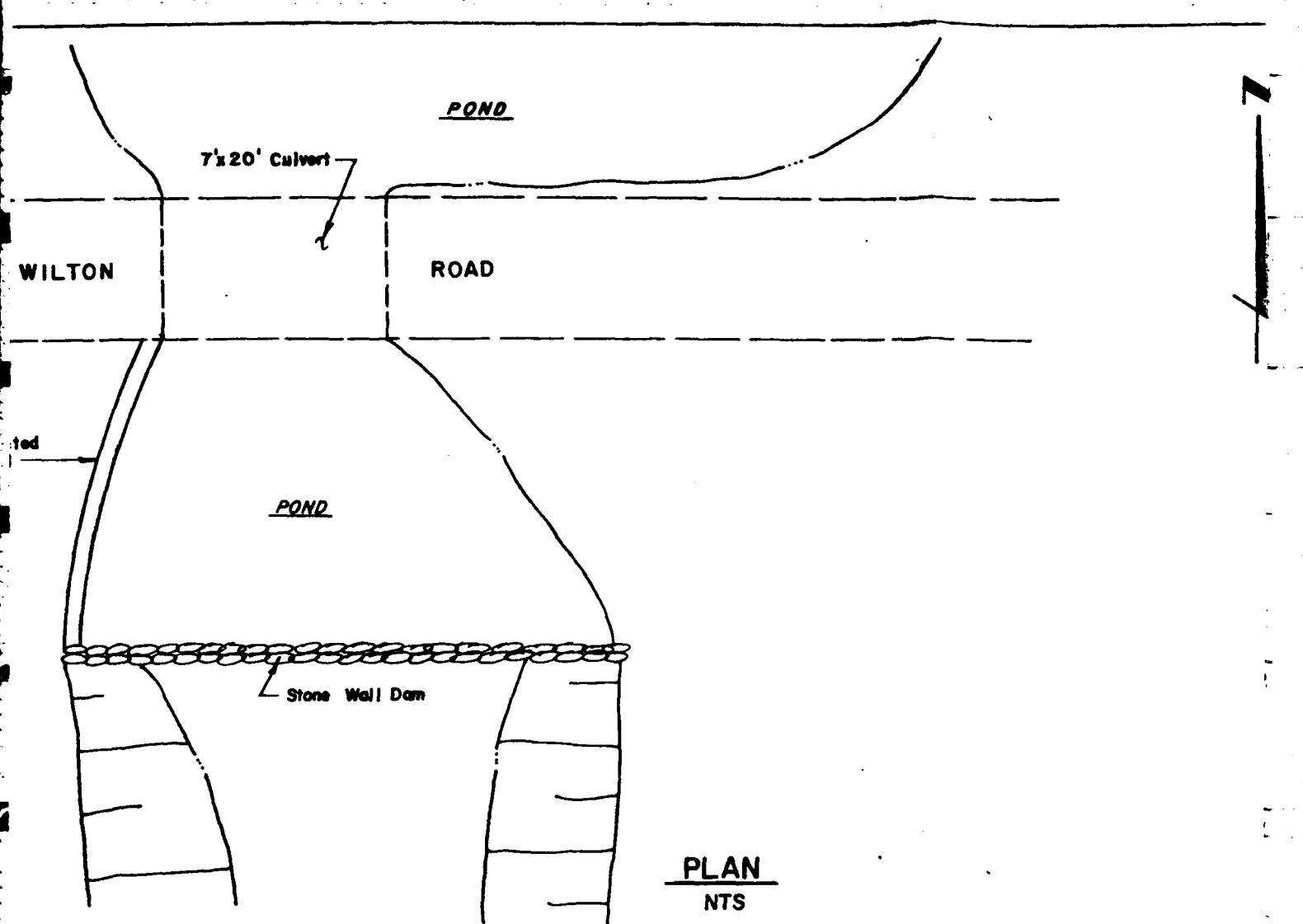
CHECK LIST
ENGINEERING DATA
DESIGN, CONSTRUCTION, OPERATION
PHASE I

NAME OF DAM Wilton Pond Dam
I.D. NO. CT-00284

| ITEM | REMARKS |
|----------------------------|--------------------------|
| AS-BUILT DRAWINGS | None exist |
| REGIONAL VICINITY MAP | Available from U.S.G.S. |
| CONSTRUCTION HISTORY | None available |
| TYPICAL SECTIONS OF DAM | Field measurements |
| OUTLETS - Plan | None |
| - Details | |
| - Constraints | |
| - Discharge Ratings | Unavailable |
| RAINFALL/RESERVOIR RECORDS | |
| DESIGN REPORTS | None |
| GEOLOGY REPORTS | None |
| DESIGN COMPUTATIONS | Limited data - DEP files |
| HYDROLOGY & HYDRAULICS | None |
| DAM STABILITY | None |
| SEEPAGE STUDIES | |
| MATERIALS INVESTIGATIONS | |
| BORINGS RECORDS | None |
| LABORATORY | None |
| FIELD | None |

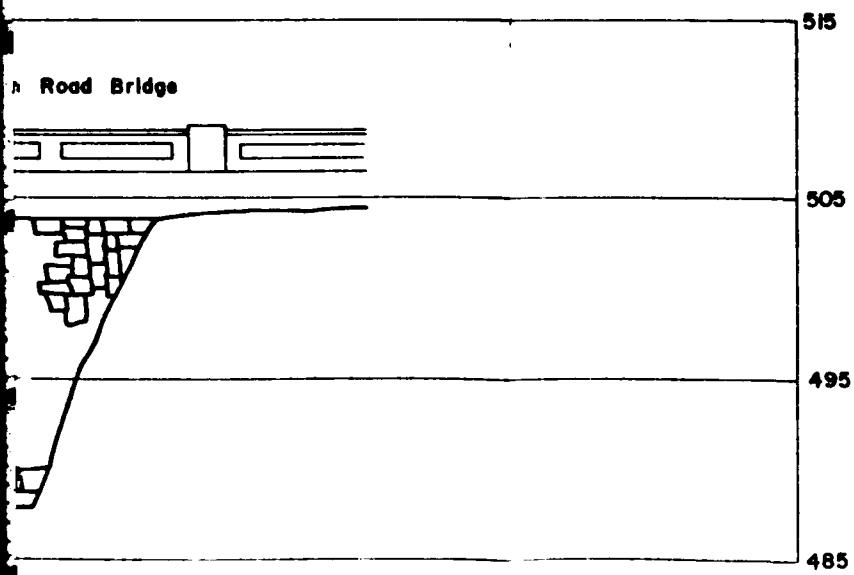
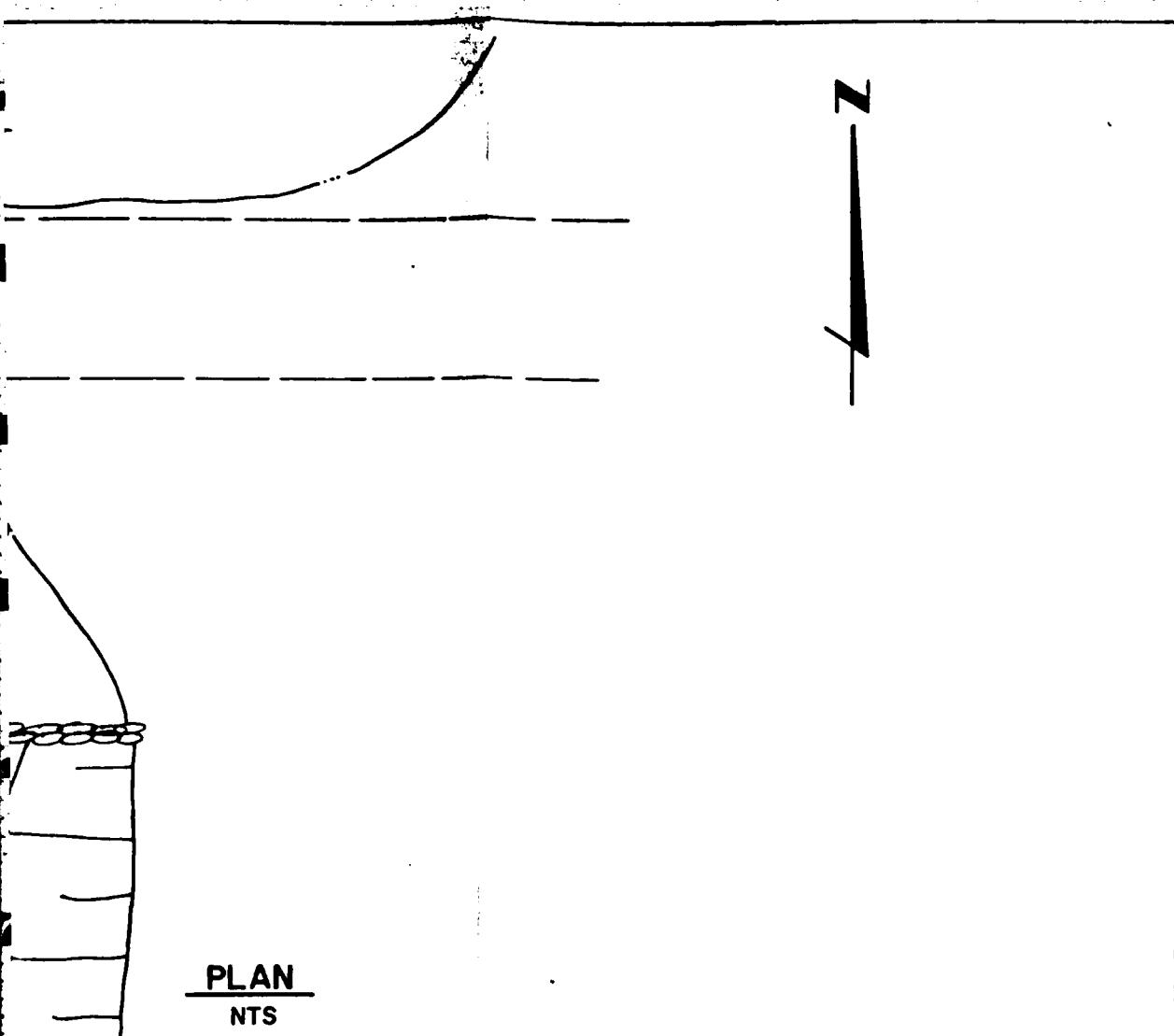
| ITEM | REMARKS |
|---|--|
| POST-CONSTRUCTION SURVEYS OF DAM | None |
| BORROW SOURCES | Unknown |
| MONITORING SYSTEMS | None |
| MODIFICATIONS | Letter reports indicate remedial measures. |
| HIGH POOL RECORDS | None available |
| POST-CONSTRUCTION ENGINEERING STUDIES AND REPORTS | Letter reports - DEP files |
| PRIOR ACCIDENTS OR FAILURE OF DAM DESCRIPTION REPORTS | Washout, right side of dam DEP files |
| MAINTENANCE OPERATION RECORDS | None |
| SPILLWAY PLAN | Field measurements |
| SECTIONS | None |
| DETAILS | No operating equipment |
| OPERATING EQUIPMENT PLANS & DETAILS | |





2

WILTON



WILTON POND DAM

(3)

B - 3

A. J. MACCHI

DR. GIULIO PIZZETTI

44 GILLET STREET
17 CORSO DUCA ABRUZZI

HARTFORD, CONN.
TORINO, ITALY

N.S.P.E.

A.S.C.E.

ENGINEERS

ASSOCIATE CONSULTANT

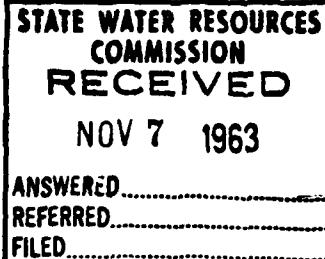
PHONE 525-8631
PHONE 519-473

A.C.I.

November 6, 1963

Water Resources Commission
State Office Building
165 Capitol Avenue
Hartford, Connecticut

Re: Wilton Pond Dam
Plymouth, Conn.



Gentlemen:

Enclosed is our report of inspection on the above-referenced dam which was authorized on October 23, 1963.

Very truly yours,

A. J. MACCHI, ENGINEERS

I. R. Skoglund
I. R. SKOGLUND, P. E.

Encl.

REPORT OF INSPECTION OF
WILTON POND DAM
PLYMOUTH, CONNECTICUT

BY A. J. MACCHI, ENGINEERS

NOVEMBER 1, 1963

| |
|---|
| STATE WATER RESOURCES COMMISSION RECEIVED NOV 7 1963 |
| ANSWERED..... |
| REFERRED..... |
| FILED..... |

1. IDENTIFICATION

- A. Letter from Water Resources Commission dated October 23, 1963.
- B. Wilton Pond Dam, Plymouth, Connecticut.
- C. Dam is located in the USGS Waterbury quadrangle N $41^{\circ}38'$, W $73^{\circ}04'$ (See enclosed sketch)
- D. Sphinx Kaabans Club
RFD 2, Terryville, Connecticut
- E. Not known by this office.

2. FACTORS OF HAZARD

- A. Not applicable in this report.
- B. Discharge from the dam enters Nibbling Brook which flows along Carter Road through residential properties then discharging into the Naugatuck River.
- C. Failure of the dam during flood flows would release quantities of stored water which could endanger life and property by washing out access roads to properties along Nibbling Brook.

3. STRUCTURE

- A. The structure is composed of a stone wall about 18' high with earth fill on the upstream face. The width at the top of the wall is 3'-0". The dam is built across a ravine about 40' wide and has a 35' wide notched spillway 1'-0" high, built into the stone wall.
- B. Existing foundation material is probably ledge, boulders, and cobbles.
- C. The 35' long by 1' high notched spillway has a capacity of about 120 C.F.S. However, considering flow across the entire length of stone dam at a 2' head would have a capacity of about 350 C.F.S.

REPORT OF INSPECTION OF
WILTON POND DAM, PLYMOUTH, CONN.

November 1, 1963

- D. The freeboard above the spillway crest to the top of dam is 1 foot. If this freeboard is exceeded the full length of the dam acts as a spillway.
- E. An area about 4' x 4' x 2' deep near the top of the dam at the west downstream face has been washed away. Also, leakage occurs through the dam at the rate 1 - 2 C.F.S. Further flood flows would cause additional erosion and leakage.

4. HYDROLOGY

- A. Net drainage area = 800 Ac.
- B. Design discharge by the Izzard method for a 100 year storm frequency = 720 C.F.S. 50 year storm frequency = 430 C.F.S.
- C. The spillway capacity assuming flow across full length of dam = 350 C.F.S.
- D. Flood flows with a reoccurrence of 10 years would probably flow over dam at height exceeding one foot.

5. SAFETY

- A. Yes, dam is unsafe at the present time.
- B. The unsafe condition is a matter of concern.
- C. During flood flows further erosion could cause sudden collapse of dam.
- D. No, dam will not require periodic inspection.

6. REQUIREMENTS

- A. Repair eroded portion of stone wall. Increase capacity of spillway.
- B. Repair to the dam could be made at any time.
- C. Repair dam as in "A" above
- D. No.

REPORT OF INSPECTION OF
WILTON POND DAM, PLYMOUTH, CONN.

November 1, 1963

7. SUMMARY OF FACTS

Wilton Pond Dam located in Plymouth, Connecticut is a stone dam which is partially eroded away and has excessive leakage through the dam. The dam discharges into Nibbling Brook below the dam. Sudden collapse of the dam would endanger life and property below the dam. The dam is stone masonry about 40' long and 18' high built across a ravine. The spillway has insufficient capacity to handle floods greater than the 10 year flood.

8. CONCLUSION

It is our opinion that the dam is unsafe at the present time and flood flows exceeding the 10 year storm would spill over the entire length of dam causing further erosion which could cause sudden collapse of the dam unleashing quantities of stored water.

9. RECOMMENDATION

- A. It is recommended that a letter of advice be sent .
- B. This should be done in the near future.
- C. Repairs recommended should be completed within one year from this inspection.

APPENDIX

- A. Net drainage area = 800 Acres.
- B. The estimated design discharge from a 100 year flood is 720 C.F.S. based on the Izzard method.
- C. Existing maximum spillway capacity = 350 C.F.S. Floods from 10 year storm or greater would exceed capacity.
- D. Structure description.
 - a. The material of the dam is stone and earth.
 - b. The dam is about 40' long and 18' high.
 - c. Probable soil conditions at the dam is gravel, boulders and ledge rock.



STATE OF CONNECTICUT
WATER RESOURCES COMMISSION
STATE OFFICE BUILDING • HARTFORD 15, CONNECTICUT

CERTIFICATE OF APPROVAL

October 21, 1965

Dr. Alfred E. Reichenbach
Sphinx Kaabans Club
186 Hillside Avenue
Waterbury, Connecticut

TOWN: Plymouth
RIVER: Naugatuck River
TRIBUTARY: Nibbling Brook
CODE NO.: N 23.4 NB 1.4

Dear Dr. Reichenbach:

NAME AND LOCATION OF STRUCTURE: Wilton Pond Dam on Nibbling Brook in
the Town of Plymouth

DESCRIPTION OF STRUCTURE AND WORK PERFORMED: Repair of the dam in
accordance with a letter dated November 7, 1963

CONSTRUCTION PERMIT ISSUED UNDER DATE OF: No Construction Permit
issued

This certifies that the work and construction included in
the plans submitted, for the structure described above, has been
completed to the satisfaction of this Commission and that this
structure is hereby approved in accordance with Section 25-114
of the 1958 Revision of the General Statutes.

The owner is required by law to record this Certificate in
the land records of the town or towns in which the structure is
located.

WATER RESOURCES COMMISSION

BY:

William S. Wise, Director

WSW:js

B-8

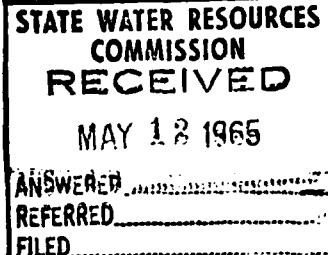
A. J. MACCHI • ENGINEERS

EXECUTIVE OFFICES • 44 GILLETT STREET • HARTFORD, CONN., 06105 • PHONE 525-6631

A. J. MACCHI
C. M. BINGHAM
H. R. HOFFMAN
I. R. SKOGLUND

ASSOCIATE CONSULTANT
PROF. C. W. DUNHAM

May 11, 1965



Water Resources Commission
State of Connecticut
165 Capitol Avenue
Hartford, Connecticut

Re: Wilton Pond Dam, Plymouth, Conn.

Gentlemen:

In accordance with your letter of May 7, 1965 this office has inspected the Wilton Pond Dam in Plymouth with regard to repairs noted in our report of inspection dated November 6, 1963.

Repairs made to the dam are replacing and jointing with mortar of stones eroded from the west downstream face, construction of concrete cap at spillway crest, placing of concrete at upstream face of dam and repairing with stone and concrete the top surface of the west abutment.

There still exists a small amount of leakage in the downstream face of the dam.

It is our opinion that the above repairs are satisfactory and that a certificate of approval should be issued.

Very truly yours,

A. J. MACCHI, ENGINEERS

I.R. SKOGLUND
I. R. SKOGLUND, P. E.

CC.

6 March 1973

Mr. Ray Snyder
114 Willow Street
Waterbury, CT

Re: Lake Wilton Dam
Plymouth

Dear Mr. Snyder:

The subject dam was inspected by the undersigned on March 2, 1973.

Numerous small leaks were noted through the dam and the east end of the spillway crest was eroded to a depth of approximately 15".

It was concluded that these conditions do not warrant reason for concern as to the safety of the dam at the present time. However, the site should be observed periodically to note the rate of deterioration. Any drastic changes should be called to the attention of this department.

We appreciate your concern and thank you for bringing this dam to our attention.

. Very truly yours,

Victor F. Galgowski
Supt. of Dam Maintenance
Water & Related Resources

VPG:ljg

LUCHS & BECKERMAN

CIVIL ENGINEERS • PLANNERS • LAND SURVEYORS

PARTNERS

JOHN LUCHS, JR.
STUART J. BECKERMAN

June 9, 1975

GLASTONBURY, CONN. 06033
12 NATIONAL DRIVE
PHONE 633-9401

PROVIDENCE, R. I. 02903
168 WEYBOSSET STREET
PHONE 421-0420

REPLY TO: Glastonbury

Mr. Victor Galgowski
Water & Related Resources
State Office Building
Department of Environmental Protection
Hartford, Connecticut 06115

Re: Wilton Pond Dam - Plymouth, Conn.
Our File #57-73-114

Dear Mr. Galgowski:

The above dam was inspected on June 6, 1975 and found to be in need of repair as soon as possible.

Between the road and the stone dam, flow through the ground or embankment has caused extensive erosion and piping. This flow needs to be stopped to prevent the complete washout of the soil and possible undermining of the stone dam. Erosion at the east end of the dam also needs to be corrected.

It would appear that a complete survey of the area is needed to show elevations and the location of a possible old flume (now leaking) would be required before a complete repair design is undertaken.

If you have any further questions, please do not hesitate to call.

Very truly yours,

LUCHS & BECKERMAN, CIVIL ENGINEERS

JLJR/ed
file

JLJR/ed
file

S. Phint Kaabane
Harold G. Kayangjian
John Luchs, Jr., P.E.
Senior Partner

John Luchs Jr.

CO
3 mil hill
Middle knell
Vol 70 pg 532

CE MAGUIRE, INC.
ENGINEERS • PLANNERS31 CANAL STREET, PROVIDENCE, RHODE ISLAND 02903 401/272-6000
60 FIRST AVENUE, WALTHAM, MASSACHUSETTS 02154 617/890-0100
1 COURT STREET, NEW BRITAIN, CONNECTICUT 06051 203/224-9141

PLEASE REPLY TO: New Britain

October 31, 1977

Mr. Walter K. Lassy, Jr.
Selectman
Plymouth Town Hall
19 East Main Street
Terryville, Connecticut 06786

RE: Wilton Pond Dam
Plymouth, Connecticut
CEM #2856

WATER RESOURCE

UNIT

RECEIVED

NOV 1 1977

ANSWERED _____

REFERRED _____

FILED _____

Dear Mr. Lassy:

As directed by the Town of Plymouth, this office has recently investigated the existing condition of Wilton Pond dam in the southwestern section of Town with respect to developing an effective way of eliminating the present leakage through the structure.

In conjunction with our investigation, we have been in contact with Northeast Gunnite and Grouting, Inc. from Everett, Massachusetts, a firm experienced in dam repair work. (Northeast Gunnite has repaired four dams in Bristol, Conn. with similar leakage problems.)

As a result of our field investigations and discussions with Northeast Gunnite we feel that an effective method of eliminating the leakage problem is to apply a 2"+ thick layer of gunnite to the entire upstream face of the dam. (The gunnite consists of a one part cement/4 part sand mixture sprayed on a wire mesh (2" x 2" #12 wire) laid on the upstream face of the dam.) In addition, the base of the dam should be pressure grouted to eliminate leakage in this area.

More specifically this work can be accomplished in the following manner:

1. King Contractors Limited, acting as the general contractor on the Carter Road reconstruction project would be responsible for dewatering the area immediately upstream of the dam. They have indicated in our recent discussions with them that this would be done by temporarily blocking the flow of water at the upstream side of Wilton Road and then pumping the water out from behind the existing dam.
2. Once the dewatering is complete, King would be responsible for clearing out any debris, sediment, etc. found behind the structure.

CE MAGUIRE, INC.

-2-

Mr. Lassy
October 31, 1977

3. Northeast Gunnite would then, acting as a subcontractor come in and:

- a. dress up the back face of the dam (i.e., remove algae growth, etc. and fill existing voids if necessary).
- b. apply the 2"± thick layer of gunnite with the wire mesh
- c. pressure grout the foundation of the dam

We have been in contact with both King Contractors and Northeast Gunnite regarding this matter. Pending approval from the State of Conn. D.E.P., we will initiate the work to be done. A copy of this letter is being forwarded to Mr. Victor Galgowsky at the D.E.P. (on his request) in an effort to expedite this matter.

We will be working closely with the D.E.P. and the Contractor in the next couple of days to insure that this work is performed as soon as possible. If you have any question regarding this matter, please do not hesitate to call this office.

Very truly yours,

CE MAGUIRE, INC.

Russell D. Tong
Russell D. Tong
Assistant Vice President

TDM/dd

✓ cc: Mr. Victor Galgowsky - State of Conn. DEP

WATER RESOURCE
UNIT
RECEIVED

NOV 1 1977

ANSWERED _____
REFERRED _____
FILED _____

COPY



STATE OF CONNECTICUT
DEPARTMENT OF ENVIRONMENTAL PROTECTION
STATE OFFICE BUILDING HARTFORD, CONNECTICUT 06115

COPY

30 June 1977

Hon. Arnold F. Wellman, Jr.
Box 122
19 Dewey Avenue
Terryville, CT 06786

Re: Wilton Pond Dam
Plymouth

REP
Dear Mr. Wellman:

Pursuant to your recent telephone inquiry, please be advised in our opinion the subject dam does require certain repairs to consider it a safe structure. The dam does not, however, appear to be in imminent danger of failing.

The consulting engineering firm which inspected the dam indicated the deficiencies to be erosion at the east end of the structure and between the road and stone dam, flow through the embankment causing extensive erosion and piping which could undermine the dam.

Pending an extensive engineering survey, it is our educated guess the cost of the repairs would be in the neighborhood of ten thousand dollars.

We welcome any assistance you can provide to arrange for the undertaking of the required alterations and the preservation of the impoundment.

Very truly yours,

Victor F. Galgowski
Supt. of Dam Maintenance
Water Resources Unit
Telephone no. 566-7245

VFG:1jk

COPY



STATE OF CONNECTICUT
DEPARTMENT OF ENVIRONMENTAL PROTECTION
STATE OFFICE BUILDING HARTFORD, CONNECTICUT 06115

COPY

3 November 1977

Mr. Russell D. Tong
Assistant Vice President
C. E. Maguire, Inc.
1 Court Street
New Britain, CT 06051

Re: Wilton Pond Dam
Plymouth

Dear Mr. Tong:

Pursuant to your recent letter pertaining to repairs to the subject dam, please be advised the guniting and grouting procedure outlined in your letter would be considered maintenance work and would, therefore, not require a construction permit from this department.

I would also call your attention to eroded areas at both ends of the dam that need to be corrected. This work would also be routine maintenance.

If, however, any changes are proposed to the design of the dam, engineering plans would have to be submitted for our approval and the issuance of a construction permit.

Please do not hesitate to contact me, if you have any questions.

Very truly yours,

Victor F. Galgowski
Supt. of Dam Maintenance
Water Resources Unit
Telephone no. 566-7245

VFG:ljk

cc: Walter K. Lassy, Jr.

LUCHS & BECKERMAN

CIVIL ENGINEERS • PLANNERS • LAND SURVEYORS

GLASTONBURY, CONN. 06033

12 NATIONAL DRIVE

PHONE 433-9401

PROVIDENCE, R. I. 02903

169 WEYBOSSET STREET

PHONE 421-0420

EAST LONGMEADOW, MASS. 01028

45 BAYMOR DRIVE

PHONE 525-6537

PARTNERSJOHN LUCHS, JR.
STUART J. BECKERMAN**WATER RESOURCES
UNIT
RECEIVED**

SEP 7 1978

September 5, 1978

ANSWERED _____

REFERRED _____

FILED _____

REPLY TO: Glastonbury

Mr. Victor Galgowski
Department of Environmental Protection
Water Resources Unit
207 State Office Building
Hartford, CT 06115

Re: Wilton Pond Dam
Our File #57-73-114

Dear Mr. Galgowski:

The above dam was visited on Thursday, August 31st, per your telephone request, with Terry D. McCarthy, P.E. from the firm of C.E. Maguire, Inc. The Maguire firm is in the process of finalizing their work on Carter Road and had done some work on the subject dam during construction.

During the visitation the following was observed:

1. The eroded area between the stone dam and Carter Road had been back-filled with rock waste from rock excavation immediately north of the dam. Pieces of blasted rock, 2'-3' in dimension, were evident from visual inspection with other pieces ranging downward in size.

Some leaking or piping was evident on the Sutliffe Brook side of the filled area.

2. Areas of exposed stone masonry had been gunite. Mr. McCarthy stated it was his understanding the gunite had been placed to a depth of 5'+ below the spillway on the upstream face and was not carried deeper due to the accumulation of sediment. The downstream face had not been gunnited.

3. Leakage through the masonry face has been eliminated near the top of the dam but is still quite extensive in the lower section.

4. Insufficient freeboard exists.

September 5, 1978

page 2

Mr. Victor Galgowski
Department of Environmental Protection

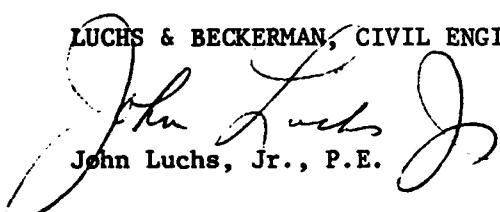
The following recommendations were made to Mr. McCarthy:

1. Add additional height (approximately 3' above the spillway crest) to the masonry wall on the westerly side of the pond between the dam and the bridge for Wilton Road. This will direct the flow over the gunnited crest of the dam and prevent over-topping of the recently filled area.
2. Add a wall on the easterly side of the dam to direct the flow over the top of the dam. This will prevent future erosion of the soil where the dam meets the ground.
3. Backfill and grade-to-drain, with impervious material, the area between the dam and the Carter Road recently filled during road construction.

It is further noted the work performed does not constitute a complete repair. There is still extensive leaking through the face of the dam and some piping through the recently placed material. Due to the age of the dam and the mass of recently placed rock debris, it is my opinion there is no hazard at this time, provided the above recommendations are followed.

Very truly yours,

LUCHS & BECKERMAN, CIVIL ENGINEERS


John Luchs, Jr., P.E.

cc: Terry McCarthy
file

C-E Maguire, Inc.
Combustion Engineering, Inc.
1 Court Street
New Britain, Connecticut 06051

Tel. 203/224-9141
Cable: CEMI



October 31, 1978

**WATER RESOURCES
UNIT
RECEIVED**

NOV 1 1978

ANSWERED _____
REFERRED _____
FILED _____

Mr. Victor Galgowski, Supt. of Dam Maintenance
State of Connecticut
Department of Environmental Protection
Water Resources Unit
207 State Office Building
Hartford, Connecticut 06115

**RE: MAINTENANCE REPAIRS ON
WILTON POND DAM
CARTER ROAD
PLYMOUTH, CONNECTICUT
CEM #2856**

Dear Mr. Galgowski:

In accordance with comments made by Mr. John Luchs of the firm of Luchs and Beckerman during our field review of the subject dam held on Thursday, August 31, 1978, additional maintenance repair work has been performed on both sides of the spillway of Wilton Pond Dam.

This recent work generally included:

- The construction of a wall on the westerly side of the dam extending from the top of the spillway northerly to the downstream face of the Wilton Road bridge abutment.
- The construction of a wall on the easterly side of the dam extending from the top of the spillway easterly to existing ground adjacent to the dam.

Both walls have been constructed in a manner that will insure that high flows from Wilton Pond will be contained within the ponded area immediately upstream of the dam and will be directed over the recently gunnited crest of the dam. The above described work was performed on September 29, 1978 and October 2, 1978 by Northeast Gunite and Grouting Corporation of Everett, Massachusetts.

October 31, 1978
Page 2
Mr. Victor Galgowski

As a result of this recent maintenance repair work, and previous maintenance repair work performed on the dam spillway in July of 1978 (as referenced in CEM's letter dated October 31, 1977 to Mr. Walter K. Lassy) we are requesting for the owner (i.e. the Town of Plymouth, Conn.) that the Wilton Pond dam be approved by the State of Connecticut DEP.

If you have any questions regarding this matter, please do not hesitate to contact me at this office.

Very truly yours,

C-E MAGUIRE, INC.

Terry D. McCarthy

Terry D. McCarthy, P.E.
Project Manager

TDM/rp

cc: Donald Kucinskas, Mayor
Walter Ricci, Director of Public Works
John Luchs, Luchs and Beckerman

LUCHS & BECKERMAN

CIVIL ENGINEERS • PLANNERS • LAND SURVEYORS

PARTNERS

JOHN LUCHS, JR.
STUART J. BECKERMAN

Flood
GLASTONBURY, CONN. 06033

12 NATIONAL DRIVE
PHONE 433-9401

PROVIDENCE, R.I. 02903
169 WEYBOSSET STREET
PHONE 421-0420

EAST LONGMEADOW, MASS. 01028
45 BAYMOR DRIVE
PHONE 525-6537

REPLY TO: Glastonbury

November 22, 1978

Mr. Victor Galgowski
Department of Environmental Protection
Water Resources Unit
207 State Office Building
Hartford, CT 06115

Re: Wilton Pond Dam
Plymouth
Our File # 57-73-114

Dear Mr. Galgowski:

In response to your letter dated 6 November 1978, it is my opinion a Certificate of Approval should not be issued.

Please refer to page 2 of my letter to you dated September 5, 1978 listing three (3) recommendations and in particular, the last paragraph. I re-visited the site on November 16, 1978 and observed the following, with respect to my recommendations:

1. A wall was constructed to a height of 18" +, not the 3" + recommended for freeboard purposes.
2. A wall was constructed but not to the 3' + for freeboard.
3. No backfilling done.

With respect to the piping through the recently placed material, please refer to my letter dated June 9, 1975 regarding the possibility of an old flume. This should be checked out by the Owner's Engineer before a repair design is started.

If you have any questions, please call.

Very truly yours,

LUCHS & BECKERMAN, CIVIL ENGINEERS

John Luchs Jr.
John Luchs, Jr., P.E.

ed

cc:file

Terry McCarthy, P.E.

WATER RESOURCES

UNIT

RECEIVED

NOV 24 1978

ANSWERED _____

REFERRED _____

FILED _____

C-E Maguire, Inc.
Combustion Engineering, Inc.
1 Court Street
New Britain, Connecticut 06051

Tel. 203/224-9141
Cable: CEMI



February 6, 1979

Mr. Victor Galgowski, Supt. of Dam Maintenance
State of Connecticut
Department of Environmental Protection
Water Resources Unit
207 State Office Building
Hartford, CT 06115

WATER RESOURCES
UNIT
RECEIVED

FEB 8 1979

RE: WILTON POND DAM
PLYMOUTH, CONNECTICUT
CEM NO. 2856

ANSWERED _____
REFERRED _____
FILED _____

Dear Mr. Galgowski:

In response to your letter dated January 16, 1979, please note that the Town of Plymouth does not intend to perform any additional work at this time on the Wilton Pond Dam.

Also, in response to your consultant's letter dated November 22, 1978, I would like to add the following:

1. With regards to items 1 and 2, the walls in question (on both sides of the spillway) were constructed as high as possible within the monies available to perform this work. The minimum elevation attained was that of the low chord of the Wilton Road bridge immediately upstream of the spillway. While the height of these walls is not enough to allow for a substantial freeboard, we feel it is high enough to satisfactorily direct high flows over the Dam's spillway without overtopping. This appears to be substantiated based on reports from the Town's Public Works Department regarding performance of the spillway during the heavy rainfall recently experienced in Connecticut. During my meeting with Mr. Luchs at the project site on August 31, 1978, I discussed the limitation of available funds and minimum wall heights with him and felt, at that time, that we were in agreement.
2. With regards to item 3, no material was available for backfilling the area in question at the time the additional Dam repair work was performed as the

Mr. Victor Galgowski
Wilton Pond Dam
February 6, 1979
Page Two

adjacent roadway work had been completed and the General Contractor was no longer on the project site. I have discussed this matter with the Town's Public Works Director and he has indicated to me that Town forces could perform this work in the spring if it is a mandatory requirement for DEP approval.

In summary, every possible attempt was made by the Town of Plymouth to comply with the maximum requirements outlined by the State. Because of financial limitations, maximum wall heights ($3\pm'$) were not attainable, however, we feel that the actual wall heights that were constructed are adequate to contain high flows from Wilton Pond within the ponded area immediately upstream of the Dam, satisfactorily direct high flows over the crest of the spillway, and prevent erosion on either side of the Dam. Based on this, we are requesting, for the Town of Plymouth, that a Certificate of Approval for this structure be issued at this time.

If you have any questions regarding this matter, or require any additional information, please do not hesitate to call me at this office.

Very truly yours,

C-E MAGUIRE, INC.

Terry D. McCarthy
Terry D. McCarthy, P.E.

TDM/vdf

cc: Messrs. Donald Kucinskas, Mayor
Walter Ricci, Director of Public Works
John Luchs, Luchs and Beckerman

LUCHS & BECKERMAN

CIVIL ENGINEERS • PLANNERS • LAND SURVEYORS

PARTNERS

JOHN LUCHS, JR.
STUART J. BECKERMAN

GLASTONBURY, CONN. 06033

12 NATIONAL DRIVE
PHONE 433-9401

PROVIDENCE, R. I. 02903
169 WEYBOSSET STREET
PHONE 421-0420

EAST LONGMEADOW, MASS. 01028
45 BAYMOR DRIVE
PHONE 525-6537

REPLY TO: Glastonbury

June 5, 1979

Mr. Victor Galgowski
Supt. of Dam Maintenance
Water Resources Unit
State of Connecticut
Dept. of Environmental Protection
State Office Building
Hartford, CT 06115

Re: Wilton Pond Dam - Plymouth, CT
Our File #57-73-114

Dear Mr. Galgowski:

In response to your letter of February 14, 1979 the following is submitted for historical reference:

1. June 9, 1975 Letter - Luchs & Beckerman reports that repair work is required as soon as possible.
2. August 31, 1978 Letter - D.E.P. requests inspection after some repair work completed.
3. Sept. 5, 1978 Letter - Luchs & Beckerman states what was observed on date of visit plus recommendations. Also, the last paragraph notes that the work performed (to that time) does not constitute a complete repair.
4. Oct. 31, 1978 Letter - C - E Maguire states additional maintenance repair work has been performed and requests approval by D.E.P.
5. Nov. 6, 1978 Letter - D.E.P. requests inspection on completed work for issuance of a Certificate of Approval.
6. Nov. 22, 1978 Letter - Luchs & Beckerman state, in their opinion, a Certificate of Approval should not be issued and the reasons why.
7. Feb. 6, 1979 Letter - C - E Maguire states the walls were built as high as possible within the monies available. Also, no material was available for backfilling.

Mr. Victor Galgowski,
Supt. of Dam Maintenance

June 4, 1979

page 2

8. February 14, 1979 Letter - D.E.P. requests a review of the February 6, 1979 letter and recommendation for a Certificate of Approval for the work completed.

There appears to be some confusion regarding the site as follows:

- a) Dam needs repair work.
- b) Town can do some work on dam as they work on adjacent road within financial constraints.
- c) Consultant inspects dam after some work done and makes recommendations.
- d) Town says all work done and Certificate of Approval requested for the (whole) dam.
- e) Consultant will not give recommendation.
- f) Town indicates they did the best they could with monies available and request a Certificate of Approval for the structure be issued.

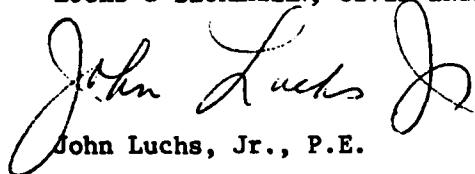
It is my opinion that repair work is still needed as stated in my June 9, 1975 letter. The work performed to date is beneficial but does not constitute a complete engineering analysis and repair.

I believe a Certificate of Approval for the whole dam is not in order. I do believe an approval for the work done (within the limits of monies available) is proper.

If there are any questions, please call.

Very truly yours,

LUCHS & BECKERMAN, CIVIL ENGINEERS



John Luchs, Jr.

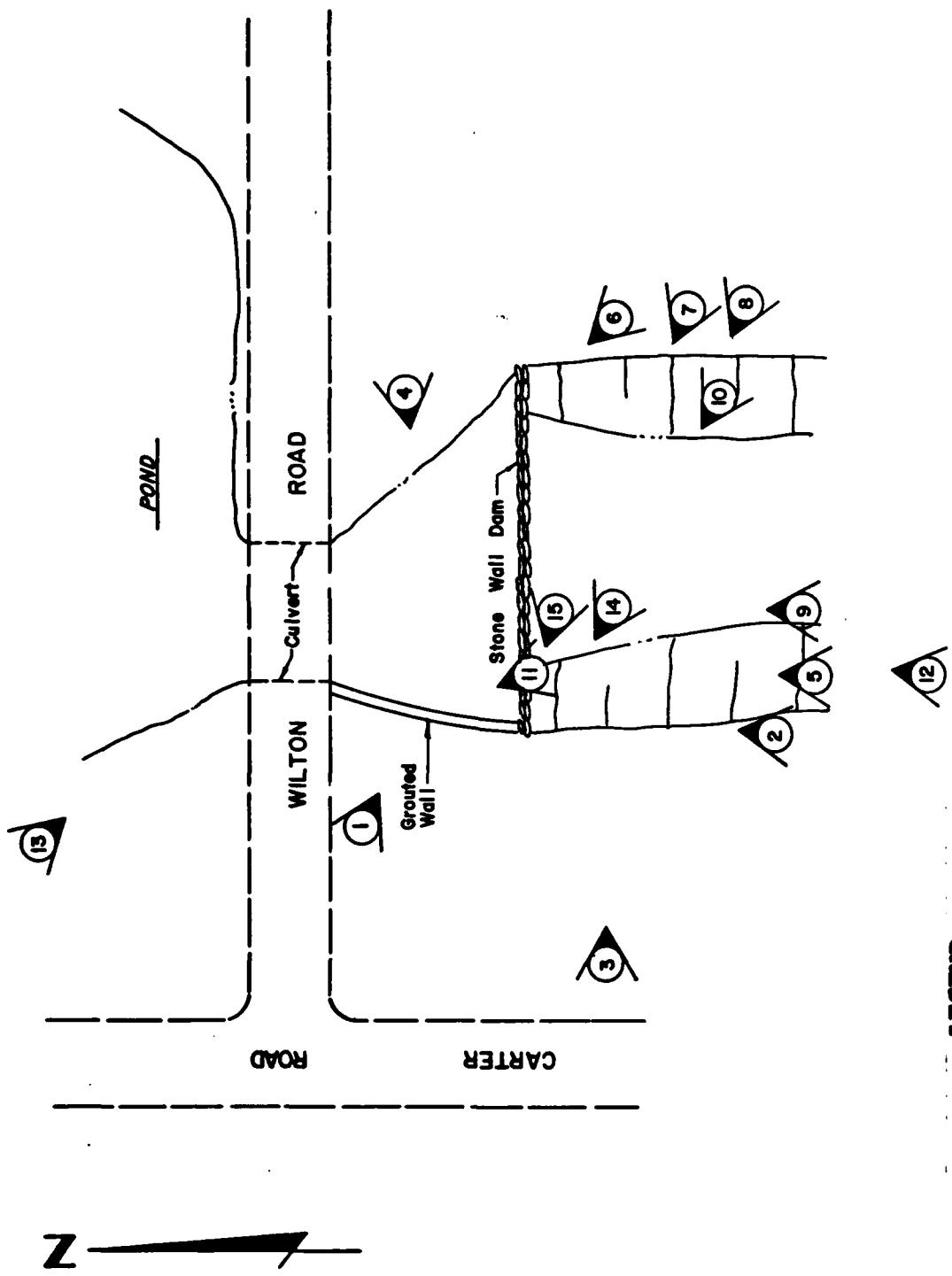
John Luchs, Jr., P.E.

JLjr/ed
Enc. (pictures)
cc: file

APPENDIX C

PHOTOGRAPHS

WILTON POND DAM
PHOTO LOCATION MAP



LEGEND

Number refers to caption.
Arrow indicates direction
of photograph.



PHOTO #1: Crest of dam from right (west) side.

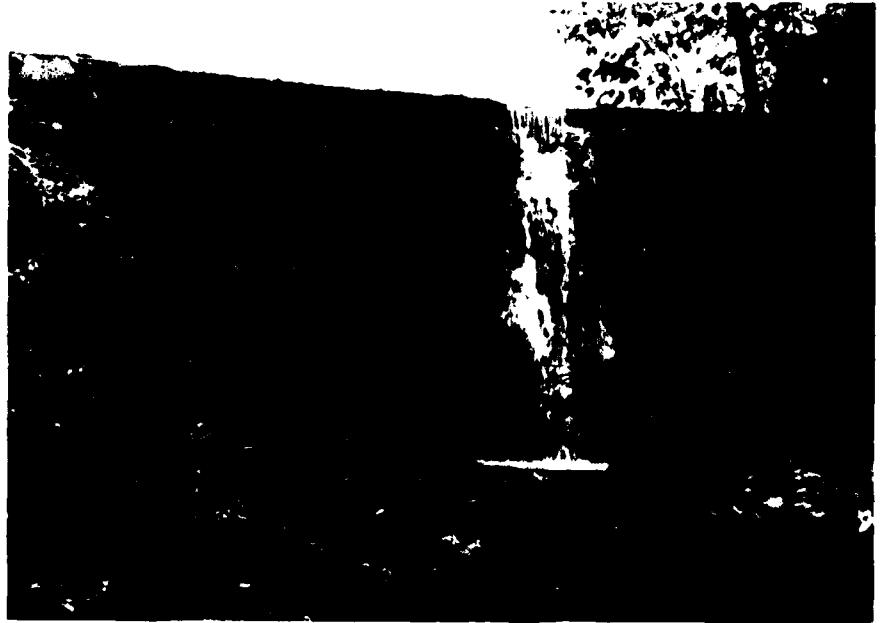


PHOTO #2: Downstream face of dam.



PHOTO #3: Overflow section from right (west) abutment.



PHOTO #4: Crest of dam looking toward right (west) abutment.



PHOTO #5: Downstream face of dam.

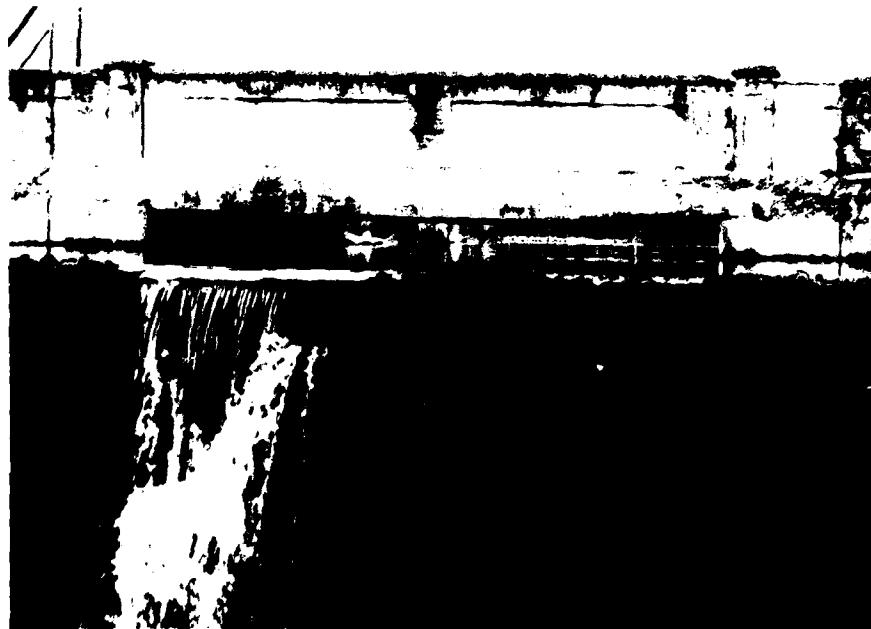


PHOTO #6: Crest of dam, looking toward Wilton Pond.



PHOTO #7: Right (west) side of dam.



PHOTO #8: Right (west) abutment.

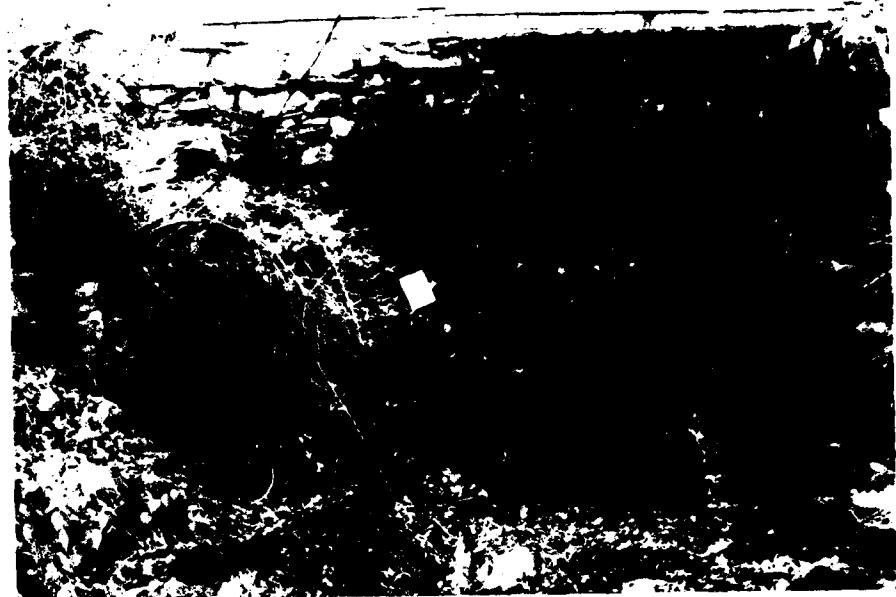


PHOTO #9: Downstream face of dam.



PHOTO #10: Right (west) side of dam. Note seepage.



PHOTO #11: 2-ft. high gunite wall just upstream of right (west) side of dam.



PHOTO #12: Looking upstream along spillway channel.



PHOTO #13: Bridge located upstream of dam.



PHOTO #14: Rock fill at right (west) side of dam.



PHOTO #15: Flow emanating from right (west) abutment area.

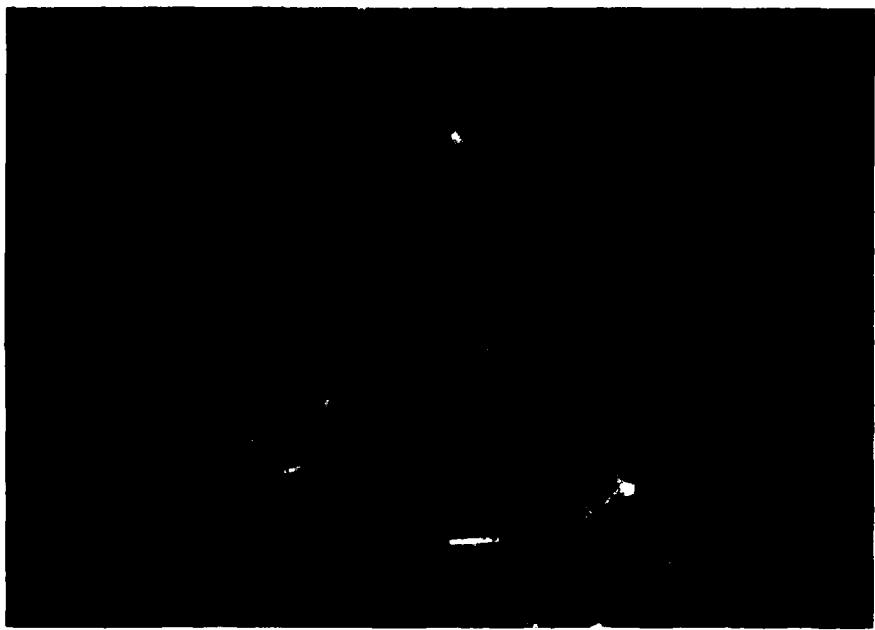


PHOTO #16: Reservoir Area.

APPENDIX D

**HYDROLOGIC AND HYDRAULIC
COMPUTATIONS**

NE WILTON POND DAM



FLAHERTY-GIAVARA ASSOCIATES
ENVIRONMENTAL DESIGN CONSULTANTS
ONE COLUMBUS PLAZA, NEW HAVEN, CONN. 06510/203/789-1280

SHEET NO. 1 OF 1
BY RAC DATE 1-15-80
CHK'D. BY JGM DATE 2-1-80

DETERMINATION OF SPILLWAY TEST FLOOD*

A. SIZE CLASSIFICATION

Storage Volume (Ac.-Ft.) 63

Height of Dam (Ft.) 16

Size Classification SMALL

B. HAZARD POTENTIAL CLASSIFICATION

| <u>Category</u> | <u>Loss of Life</u> | <u>Economic Loss</u> |
|-----------------|---------------------|----------------------|
| Low | None expected | Minimal |
| Significant | <u>Few</u> | <u>Appreciable</u> |
| High | More than few | Excessive |

Hazard Classification SIGNIFICANT

C. HYDROLOGIC EVALUATION GUIDELINES

| <u>Hazard</u> | <u>Size</u> | <u>Spillway Test Flood*</u> |
|---------------|--------------|--------------------------------------|
| Low | Small | 50 to 100-Year Frequency |
| | Intermediate | 100-Year Frequency to 1/2 PMF |
| | Large | 1/2 PMF to PMF |
| Significant | <u>Small</u> | <u>100-Year</u> Frequency to 1/2 PMF |
| | Intermediate | 1/2 PMF to PMF |
| | Large | PMF |
| High | Small | 1/2 PMF to PMF |
| | Intermediate | PMF |
| | Large | PMF |

Spillway Test Flood* 100 YR FREQUENCY

*Based upon "Recommended Guidelines for Safety Inspection of Dams" Department of the Army, Office of the Chief of Engineers, November 1976.

CT 799010
JAN POND DAM
WOMASTON, CONN.



FLAHERTY-GIAVARA ASSOCIATES SHEET NO. 2 OF
ENVIRONMENTAL DESIGN CONSULTANTS BY RAG DATE 2-1-80
ONE COLUMBUS PLAZA, NEW HAVEN, CONN. 06510/203/789-1260
CHK'D. BY JGM DATE 2-2-80

SPILLWAY TEST FLOOD

Due to the small watershed drainage area of 1.27 square miles the spillway test flood will be determined by an empirical method developed by the U.S. Soil Conservation Service, as described in the book "Design of Small Dams".

Storm durations of 1 hour and 6 hour will be tried to identify the more critical condition.

RAINFALL

6 hour rain. = 5.0 inches (Conn DOT drainage manual)

1 hour rain = 3.0 inches

RUNOFF

Watershed is glacial till, say "CN" = 80, partially saturated prior to storm

Runoff for 6 hr storm = 2.89 "

Runoff for 1 hr storm = 1.25 "

TIME FACTOR

$$T_c = \left[\frac{11.9 L^3}{H} \right]^{0.385}$$

$$L = 8,400' / 5280' / \text{MILE} = 1.59 \text{ MILES}$$

$$H = 1000' - 504 = 596'$$

$$T_c = \left(\frac{11.9 L^3}{H} \right)^{0.385}$$

JECT '74 YO 10
IRON POND DAM
WATKIN CONC



FLAHERTY-GIARAVIA ASSOCIATES
ENVIRONMENTAL DESIGN CONSULTANTS
ONE COLUMBUS PLAZA, NEW HAVEN, CONN. 06510/203/789-1260

SHEET NO. 3 OF
 BY RAC DATE 2-1-80
 CHK'D. BY JGM DATE 2-2-80

$$T_c = \left[\frac{11.9 (1.59)^3}{596} \right]^{0.385} = 0.38 \text{ HOURS}$$

DUE TO A ROUGH, POORLY DEFINED CHANNEL,
INCREASE T_c BY 50% TO 0.57 HOURS.

TIME TO PEAK

$$T_p = \frac{D}{2} + 0.6 T_c$$

$$6 \text{ HR STORM } T_p = \frac{6}{2} + 0.6(0.6) = 3.4 \text{ HRS.}$$

$$1 \text{ HR STORM } T_p = \frac{1}{2} + 0.6(0.6) = 0.9 \text{ HRS.}$$

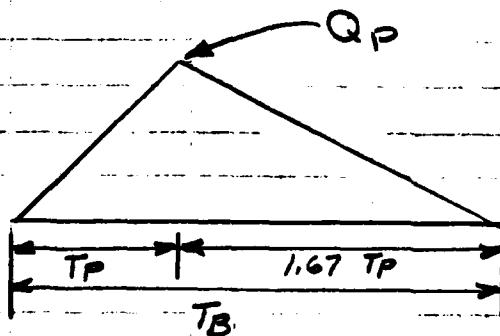
PEAK RATE OF RUNOFF

$$Q_p = 484 A R / T_p$$

$$Q_6 = 484 (1.27)(2.89") / 3.4 = 522 \text{ CFS}$$

$$Q_1 = 484 (1.27)(1.25") / 0.9 = 854 \text{ CFS}$$

IN ORDER TO DO THE FLOOD ROUTING ANALYSIS,
A TRIANGULAR HYDROGRAPH WILL BE
UTILIZED WITH A PEAK FLOW OF "Q_p"
AND A BASE LENGTH OF $2.67 T_p$



$$T_{B(1)} = 2.67 T_p = 2.67(0.9) = 2.4 \text{ HOURS}$$

$$T_{B(6)} = 2.67 T_p = 2.67(3.4) = 9.1 \text{ HOURS}$$

D-3

JECT 79-90-10
LTON POND DAM



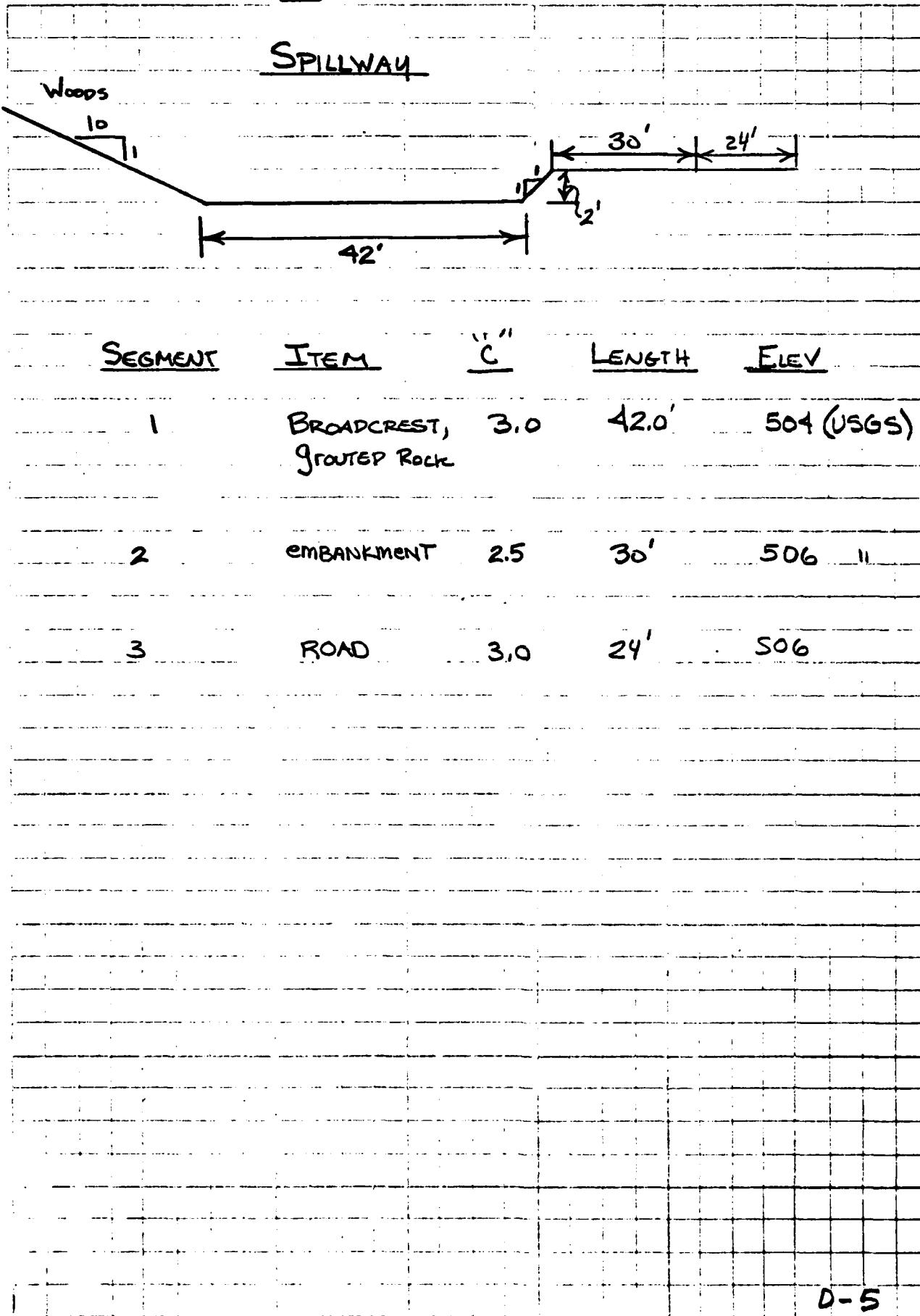
FLAHERTY-GIAVARA ASSOCIATES SHEET NO. 4 OF _____
ENVIRONMENTAL DESIGN CONSULTANTS BY RAC DATE 2-1-80
ONE COLUMBUS PLAZA, NEW HAVEN, CONN. 06510/203/789-1200 CHK'D. BY JGM DATE 2-2-80

100 YEAR FLOOD
1 HR RAIN DURATION

| <u>STORM HOUR</u> | <u>PEAK FLOW, CFS</u> |
|-----------------------|---------------------------|
| 0 | 0 |
| 0.3 | 284 |
| 0.6 | 569 |
| 0.9 | 854 |
| 1.2 | 683 |
| 1.5 | 512 |
| 1.8 | 342 |
| 2.1 | 171 |
| 2.4 | 0 |

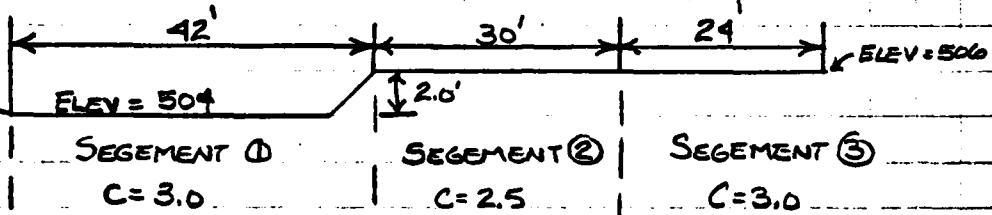
100 YEAR FLOOD
6 HR RAIN DURATION

| <u>STORM HOUR</u> | <u>PEAK FLOW, CFS</u> |
|-----------------------|---------------------------|
| 0 | 0 |
| 1.0 | 154 |
| 2.0 | 307 |
| 3.0 | 461 |
| 3.4 | 522 |
| 4.0 | 467 |
| 5.0 | 375 |
| 6.0 | 284 |
| 7.0 | 192 |
| 8.0 | 101 |
| 9.1 | 0 |

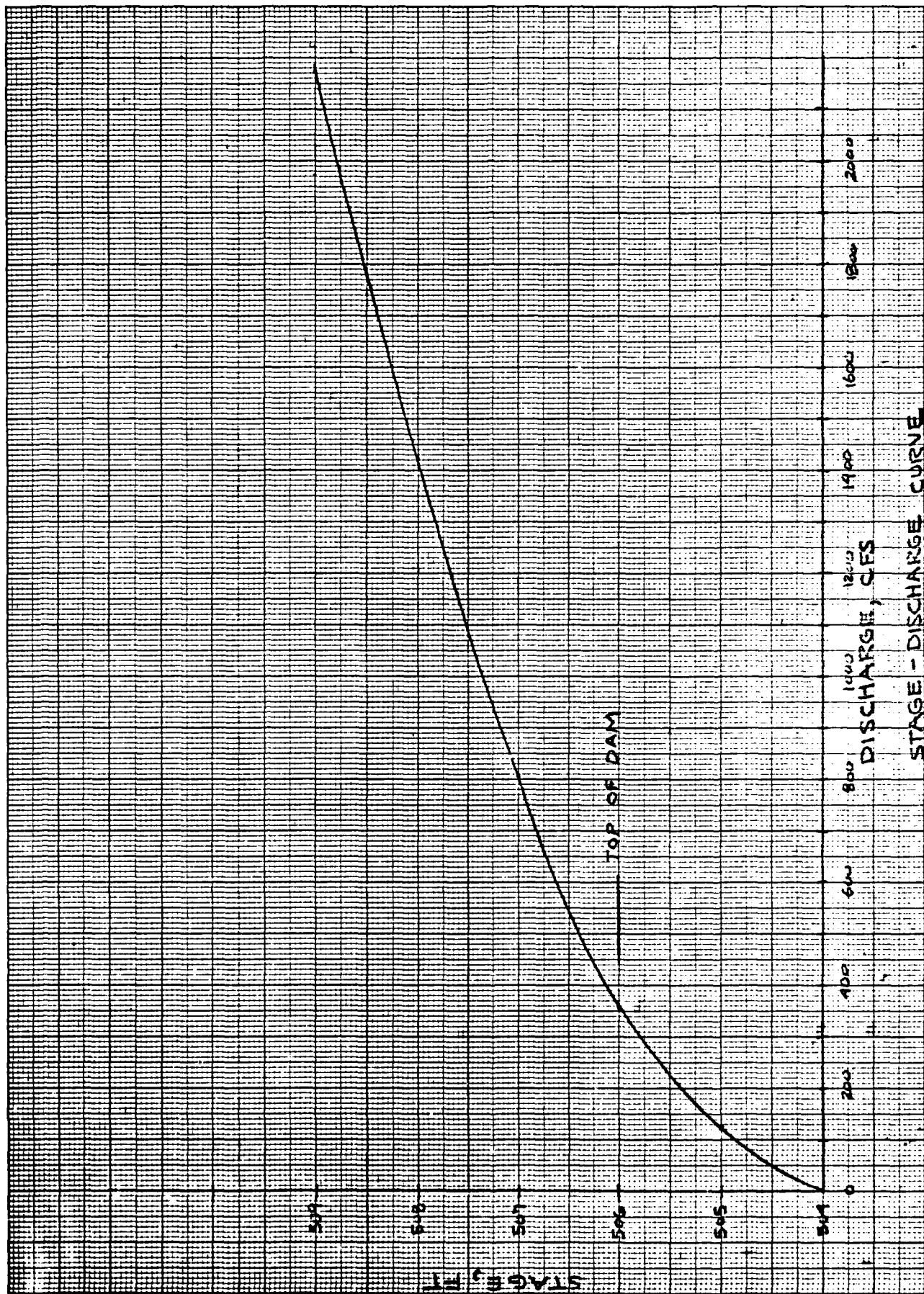




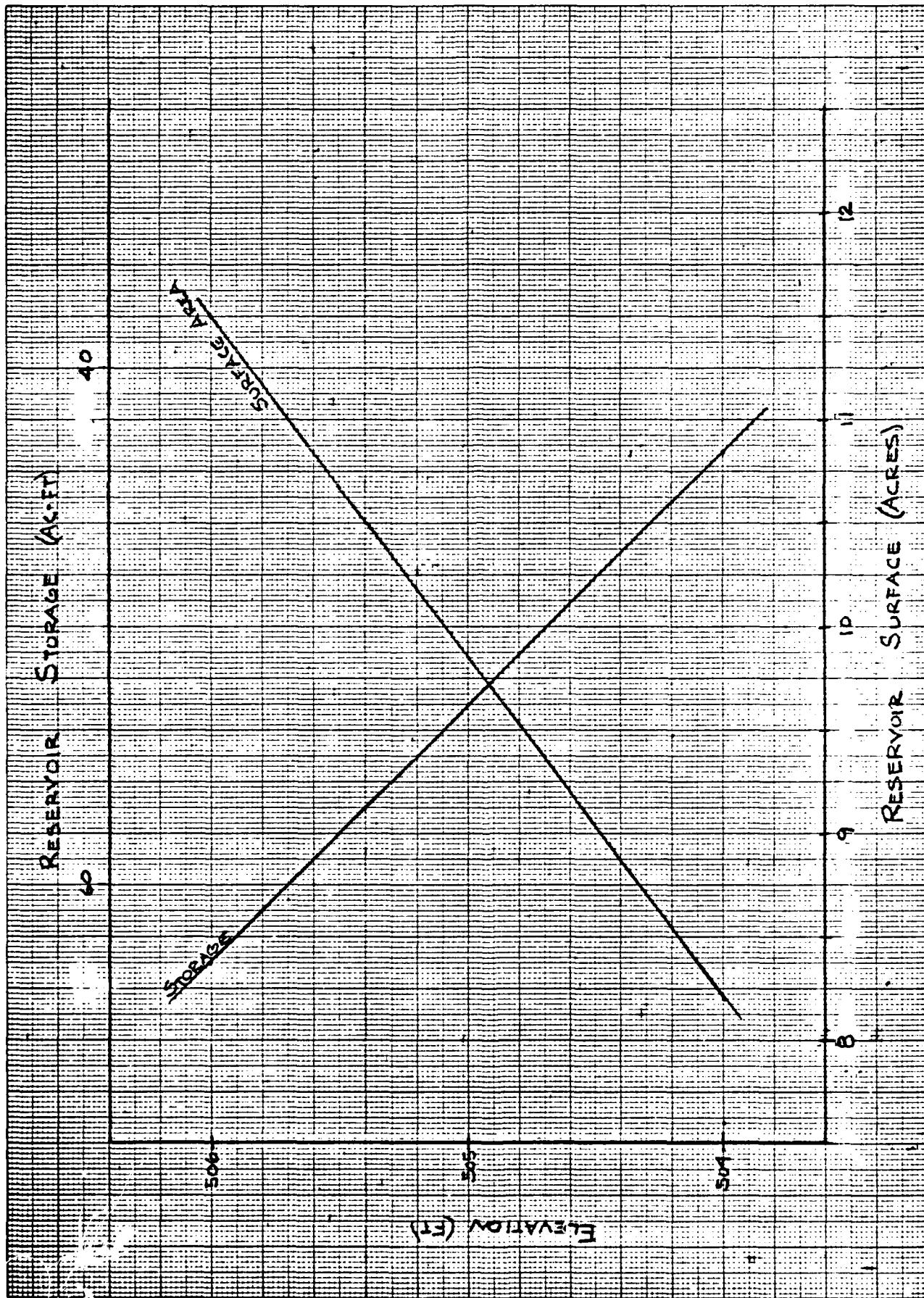
STAGE DISCHARGE DATA N.T.S.



| | ELEV | 505 | 506 | 507 | 508 | 509 |
|--|------|-----|-----|-----|------|------|
| $Q_1 = C_1 L_1 H_1^{3/2}$ (3)(42) | | 126 | 356 | 655 | 1008 | 1409 |
| $Q_2 = C_2 L_2 H_2^{3/2}$ (2.5)(30) | | | | 75 | 212 | 390 |
| $Q_3 = C_3 L_3 H_3^{3/2}$ (3)(24) | | | | 72 | 204 | 374 |
| TOTAL | | 126 | 356 | 802 | 1429 | 2173 |



D-7



WILTON POND 1 HR STM FLOOD ROUTING

JGM

2/6/80

INPUT DATA:
 SEGMENT 1
 SEGMENT 2
 SEGMENT 3
 IE=504.0 IV=

UNSUBMERGED WEIR
 DISCHARGE COEFFICIENT = 3
 DISCHARGE COEFFICIENT = 2.5
 DISCHARGE COEFFICIENT = 3
 0.0 E=504.0 A= 8.20

LENGTH OF WEIR = 42
 LENGTH OF WEIR = 30
 LENGTH OF WEIR = 24
 LENGTH OF WEIR = 18.00

ELEVATION OF WEIR = 504
 ELEVATION OF WEIR = 506
 ELEVATION OF WEIR = 506

| HOUR | INFLOW | MASS INFLOW | WATER EL. TAIL WATER | OUTFLOW | MASS OUTFLOW | STORAGE(R) | STORAGE(A) |
|------|---------|-------------|----------------------|---------|--------------|------------|------------|
| 0.00 | 0 CFS | 0.00AAC-F | 504.00FT | .00FT | 0 CFS | 0.00AAC-F | 0.00AAC-F |
| 0.30 | 284 CFS | 3.52AC-F | 504.37FT | 0.00FT | 28CFS | 0.35AC-F | 3.16AC-F |
| 0.60 | 569 CFS | 14.09AC-F | 505.22FT | 0.00FT | 170CFS | 2.82AC-F | 11.26AC-F |
| 0.90 | 854 CFS | 31.73AC-F | 506.17FT | 0.00FT | 413CFS | 10.07AC-F | 21.66AC-F |
| 1.20 | 683 CFS | 50.78AC-F | 506.67FT | 0.00FT | 631CFS | 23.03AC-F | 27.75AC-F |
| 1.50 | 512 CFS | 65.60AC-F | 506.62FT | 0.00FT | 609CFS | 38.42AC-F | 27.17AC-F |
| 1.80 | 342 CFS | 76.19AC-F | 506.37FT | 0.00FT | 494CFS | 52.11AC-F | 24.07AC-F |
| 2.10 | 171 CFS | 82.54AC-F | 506.01FT | 0.00FT | 360CFS | 62.71AC-F | 19.83AC-F |
| 2.40 | 0 CFS | 84.66AC-F | 505.53FT | 0.00FT | 239CFS | 70.15AC-F | 14.51AC-F |

D-9

WILTON POND 6 HR STM FLOOD ROUTING

JGM

2/6/80

INPUT DATA:
 SEGMENT 1 UNSUBMERGED WEIR
 DISCHARGE COEFFICIENT = 3.5 LENGTH OF WEIR = 42
 SEGMENT 2 DISCHARGE COEFFICIENT = 2.5 LENGTH OF WEIR = 30
 SEGMENT 3 DISCHARGE COEFFICIENT = 3 LENGTH OF WEIR = 24
 1E-504.0 IV- 0.0 E=504.0 A= 8.20 E-510.0 A= 18.00

ELEVATION OF WEIR = 504
 ELEVATION OF WEIR = 506
 ELEVATION OF WEIR = 506
 ELEVATION OF WEIR = 506

| HOUR | INFLOW | MASS INFLOW | WATER EL. | TAIL WATER | OUTFLOW | MASS OUTFLOW | STORAGE (R) | STORAGE (A) |
|------|---------|-------------|-----------|------------|---------|--------------|-------------|-------------|
| 0.00 | 0 CFS | 0.000AC-F | 504.00FT | 0.00FT | 0 CFS | 0.000AC-F | 0.00AC-F | 0.00AC-F |
| 1.00 | 154 CFS | 6.36AC-F | 504.51FT | 0.00FT | 46CFS | 1.92AC-F | 4.43AC-F | 4.43AC-F |
| 2.00 | 307 CFS | 25.41AC-F | 505.39FT | 0.00FT | 207CFS | 12.40AC-F | 13.00AC-F | 13.00AC-F |
| 3.00 | 461 CFS | 57.14AC-F | 506.07FT | 0.00FT | 379CFS | 36.63AC-F | 20.51AC-F | 20.51AC-F |
| 3.40 | 522 CFS | 73.39A-F | 506.28FT | 0.00FT | 456CFS | 50.43AC-F | 22.95AC-F | 22.95AC-F |
| 4.00 | 467 CFS | 97.91AC-F | 506.36FT | 0.00FT | 491CFS | 73.93AC-F | 23.98AC-F | 23.98AC-F |
| 5.00 | 375 CFS | 132.71AC-F | 506.16FT | 0.00FT | 409CFS | 111.17AC-F | 21.53AC-F | 21.53AC-F |
| 6.00 | 284 CFS | 159.94AC-F | 505.88FT | 0.00FT | 326CFS | 141.58AC-F | 18.35AC-F | 18.35AC-F |
| 7.00 | 192 CFS | 179.61AC-F | 505.54FT | 0.00FT | 241CFS | 165.02AC-F | 14.58AC-F | 14.58AC-F |
| 8.00 | 101 CFS | 191.71AC-F | 505.13FT | 0.00FT | 153CFS | 181.32AC-F | 10.39AC-F | 10.39AC-F |
| 9.10 | 0 CFS | 196.30AC-F | 504.60FT | 0.00FT | 59CFS | 191.00AC-F | 5.30AC-F | 5.30AC-F |

D-10

WILTON POND DAM

799010 RAC APRIL 11, 1980

FGA FLOOD WAVE ROUTING

APPROXIMATE FLOOD WAVE ROUTING BASED UPON U.S. ARMY CORPS
OF ENGINEERS' "RULE OF THUMB GUIDANCE FOR ESTIMATING
DOWNSTREAM DAM FAILURE HYDROGRAPHS" DATED APRIL, 1978.

INITIAL STATION = 0 +0
INITIAL BASE FLOW = 356 CFS.
INITIAL WAVE HEIGHT = 16.0 FT
ASSUMED BREACH WIDTH = 28.0 FT
INITIAL RESERVOIR STURAGE = 63 ACRE-FT
COMPUTED FLOOD WAVE PEAK FLOW = 3,011 CFS
TOTAL FLOOD WAVE PEAK FLOW = 3,367CFS

STATION 1 +0

| OFFSET | ELEV. | OFFSET | ELEV. | OFFSET | ELEV. |
|-------------|----------|-----------|----------|-----------|----------|
| $N = 0.080$ | | | | | |
| -570.0 FT | 600.0 FT | -300.0 FT | 550.0 FT | -230.0 FT | 540.0 FT |
| -100.0 FT | 510.0 FT | | | | |
| $N = 0.040$ | | | | | |
| -100.0 FT | 510.0 FT | -5.0 FT | 500.0 FT | 5.0 FT | 500.0 FT |
| | | | | | |
| $N = 0.080$ | | | | | |
| 5.0 FT | 500.0 FT | 90.0 FT | 510.0 FT | 280.0 FT | 520.0 FT |
| 420.0 FT | 550.0 FT | 720.0 FT | 600.0 FT | | |

| AREA | WETTED PERIMETER | N | VELOCITY | FLOW |
|----------|------------------|-------|----------|----------|
| 115.3 SF | 48.0 FT | 0.040 | 23.0 FPS | 2,661CFS |
| 67.5 SF | 34.1 FT | 0.080 | 10.1 FPS | 685CFS |

| INVERT | DEPTH | W. SURFACE | AREA | VELOCITY | FLOW | SLOPE |
|----------|--------|------------|--------|----------|-----------|--------|
| 500.0 FT | 3.9 FT | 503.9 FT | 182 SF | 18.2 FPS | 3,347 CFS | 0.1200 |

BASE FLOW = 356 CFS BASE STAGE = 501.4 FT.

STATION 8+50

| OFFSET | ELEV. | OFFSET | ELEV. | OFFSET | ELEV. |
|-----------|----------|-----------|----------|-----------|----------|
| N = 0.080 | | | | | |
| -620.0 FT | 550.0 FT | -520.0 FT | 500.0 FT | -480.0 FT | 490.0 FT |
| -420.0 FT | 480.0 FT | -5.0 FT | 474.0 FT | | |

| | | | | | |
|-----------|----------|--------|----------|--|--|
| N = 0.040 | | | | | |
| -5.0 FT | 474.0 FT | 5.0 FT | 474.0 FT | | |

| | | | | | |
|-----------|----------|----------|----------|----------|----------|
| N = 0.080 | | | | | |
| 5.0 FT | 474.0 FT | 170.0 FT | 480.0 FT | 280.0 FT | 490.0 FT |
| 310.0 FT | 500.0 FT | 570.0 FT | 550.0 FT | | |

| AREA | WETTED PERIMETER | N | VELOCITY | FLOW |
|----------|------------------|-------|----------|----------|
| 360.7 SF | 223.4 FT | 0.080 | 4.6 FPS | 1,675CFS |
| 32.2 SF | 10.0 FT | 0.040 | 14.7 FPS | 476CFS |
| 143.4 SF | 88.8 FT | 0.080 | 4.6 FPS | 665CFS |

| INVERT | DEPTH | W. SURFACE | AREA | VELOCITY | FLOW | SLOPE |
|----------|--------|------------|--------|----------|-----------|--------|
| 474.0 FT | 3.2 FT | 477.2 FT | 536 SF | 5.2 FPS | 2,817 CFS | 0.0330 |

BASE FLOW = 356 CFS BASE STAGE = 475.3 FT.

STATION 17+80

| OFFSET | ELEV. | OFFSET | ELEV. | OFFSET | ELEV. |
|-----------|----------|-----------|-----------|----------|----------|
| | | | N = 0.080 | | |
| -220.0 FT | 550.0 FT | -120.0 FT | 500.0 FT | -5.0 FT | 465.0 FT |
| | | | N = 0.040 | | |
| -5.0 FT | 465.0 FT | 5.0 FT | 465.0 FT | | |
| | | | N = 0.080 | | |
| 5.0 FT | 465.0 FT | 30.0 FT | 470.0 FT | 130.0 FT | 480.0 FT |
| 230.0 FT | 490.0 FT | 300.0 FT | 500.0 FT | 520.0 FT | 550.0 FT |

| AREA | WETTED PERIMETER | N | VELOCITY | FLOW |
|----------|------------------|-------|----------|----------|
| 106.3 SF | 27.6 FT | 0.080 | 4.5 FPS | 485CFS |
| 80.4 SF | 10.0 FT | 0.040 | 14.9 FPS | 1,200CFS |
| 185.0 SF | 56.1 FT | 0.080 | 4.1 FPS | 761CFS |

| INVERT | DEPTH | W. SURFACE | AREA | VELOCITY | FLOW | SLOPE |
|-------------|---------|--------------|-----------|----------|-----------|--------|
| 465.0 FT | 8.0 FT | 473.0 FT | 371 SF | 6.5 FPS | 2,446 CFS | 0.0100 |
| BASE FLOW = | 356 CFS | BASE STAGE = | 468.1 FT. | | | |

STATION 32 +0

| OFFSET | ELEV. | OFFSET | ELEV. | OFFSET | ELEV. |
|-----------|----------|-----------|-----------|-----------|----------|
| | | | N = 0.080 | | |
| -300.0 FT | 500.0 FT | -160.0 FT | 450.0 FT | -110.0 FT | 440.0 FT |
| -70.0 FT | 430.0 FT | -5.0 FT | 425.0 FT | | |
| | | | N = 0.040 | | |
| -5.0 FT | 425.0 FT | 5.0 FT | 425.0 FT | | |
| | | | N = 0.080 | | |
| 5.0 FT | 425.0 FT | 170.0 FT | 430.0 FT | 280.0 FT | 450.0 FT |
| 420.0 FT | 500.0 FT | | | | |

| AREA | WETTED PERIMETER | N | VELOCITY | FLOW |
|----------|------------------|-------|----------|-----------|
| 86.9 SF | 47.6 FT | 0.080 | 4.6 FPS | 403 CFS |
| 36.5 SF | 10.0 FT | 0.040 | 14.7 FPS | 539 CFS |
| 220.7 SF | 120.7 FT | 0.080 | 4.6 FPS | 1,025 CFS |

| INVERT | DEPTH | W. SURFACE | AREA | VELOCITY | FLOW | SLOPE |
|-------------|---------|--------------|-----------|----------|-----------|--------|
| -425.0 FT | 3.6 FT | 428.6 FT | 344 SF | 5.7 FPS | 1,968 CFS | 0.0280 |
| BASE FLOW = | 356 CFS | BASE STAGE = | 426.7 FT. | | | |

STATION 50 +0

| OFFSET | ELEV. | OFFSET | ELEV. | OFFSET | ELEV. |
|----------|----------|---------|-----------|----------|----------|
| | | | N = 0.080 | | |
| -80.0 FT | 400.0 FT | -5.0 FT | 355.0 FT | | |
| | | | N = 0.040 | | |
| -5.0 FT | 355.0 FT | 5.0 FT | 355.0 FT | | |
| | | | N = 0.080 | | |
| 5.0 FT | 355.0 FT | 50.0 FT | 360.0 FT | 100.0 FT | 380.0 FT |

| AREA | WETTED PERIMETER | N | VELOCITY | FLOW |
|----------|------------------|-------|----------|--------|
| 18.9 SF | 9.2 FT | 0.080 | 5.8 FPS | 110CFS |
| 47.6 SF | 10.0 FT | 0.040 | 20.5 FPS | 978CFS |
| 102.2 SF | 43.1 FT | 0.080 | 6.4 FPS | 658CFS |

| INVERT | DEPTH | W. SURFACE | AREA | VELOCITY | FLOW | SLOPE |
|----------|--------|------------|--------|----------|-----------|--------|
| | | | | | | |
| 355.0 FT | 4.7 FT | 359.7 FT | 168 SF | 10.3 FPS | 1,746 CFS | 0.0380 |

BASE FLOW = 356 CFS BASE STAGE = 357.1 FT.

STATION 57 +0

| OFFSET | ELEV. | OFFSET | ELEV. | OFFSET | ELEV. |
|--------|-------|--------|-------|--------|-------|
|--------|-------|--------|-------|--------|-------|

| | | | | | |
|----------|----------|-----------|----------|--|--|
| | | N = 0.080 | | | |
| -50.0 FT | 350.0 FT | -5.0 FT | 327.0 FT | | |

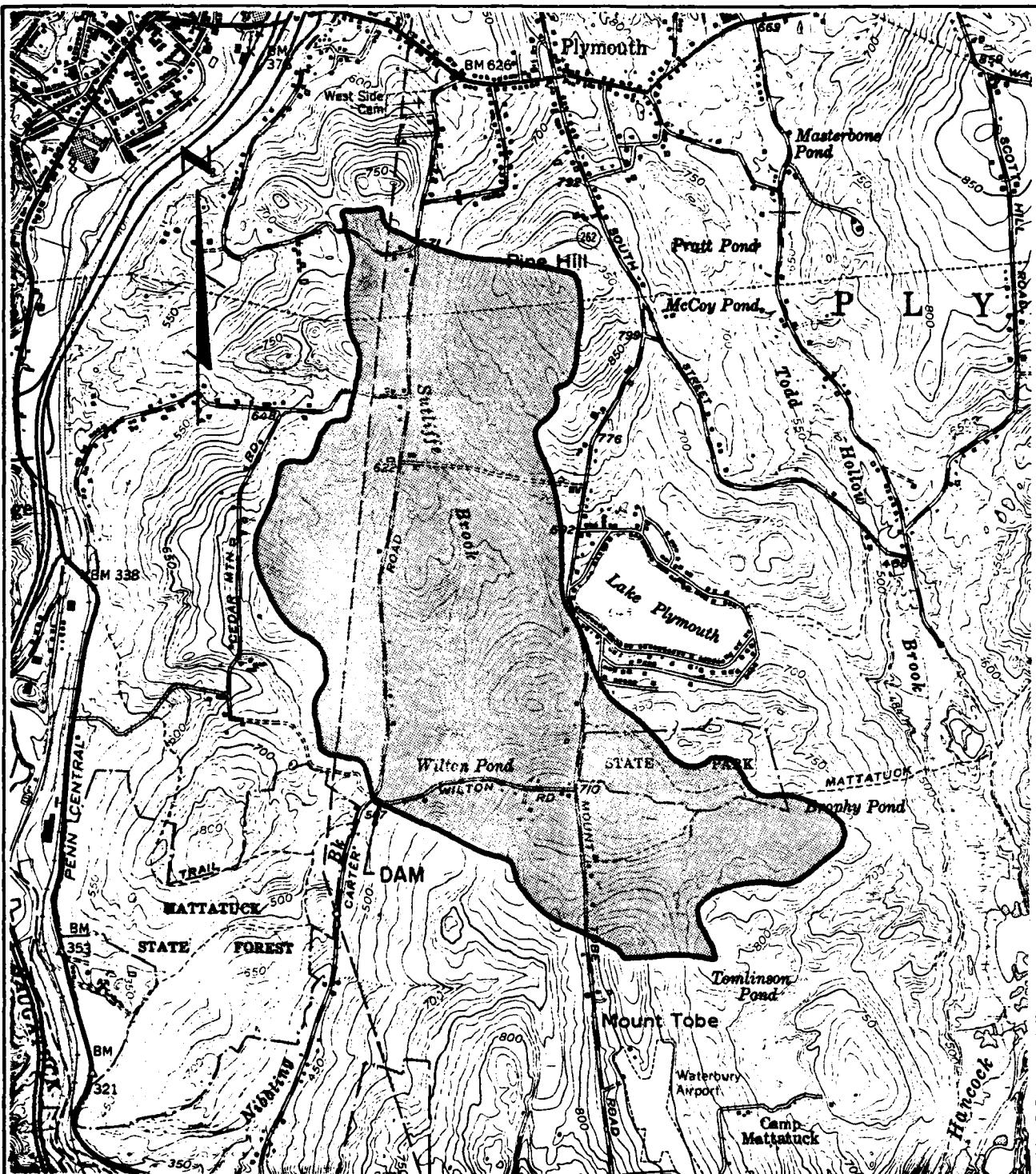
| | | | | | |
|---------|----------|-----------|----------|--|--|
| | | N = 0.040 | | | |
| -5.0 FT | 327.0 FT | 5.0 FT | 327.0 FT | | |

| | | | | | |
|--------|----------|-----------|----------|----------|----------|
| | | N = 0.050 | | | |
| 5.0 FT | 327.0 FT | 200.0 FT | 330.0 FT | 280.0 FT | 350.0 FT |

| AREA | WETTED PERIMETER | N | VELOCITY | FLOW |
|----------|------------------|-------|----------|----------|
| 5.7 SF | 5.3 FT | 0.080 | 3.9 FPS | 22CFS |
| 24.2 SF | 10.0 FT | 0.040 | 13.4 FPS | 325CFS |
| 191.6 SF | 157.8 FT | 0.050 | 6.7 FPS | 1,295CFS |

| INVERT | DEPTH | W. SURFACE | AREA | VELOCITY | FLOW | SLOPE |
|----------|--------|------------|--------|----------|-----------|--------|
| 327.0 FT | 2.4 FT | 329.4 FT | 221 SF | 7.4 FPS | 1,644 CFS | 0.0400 |

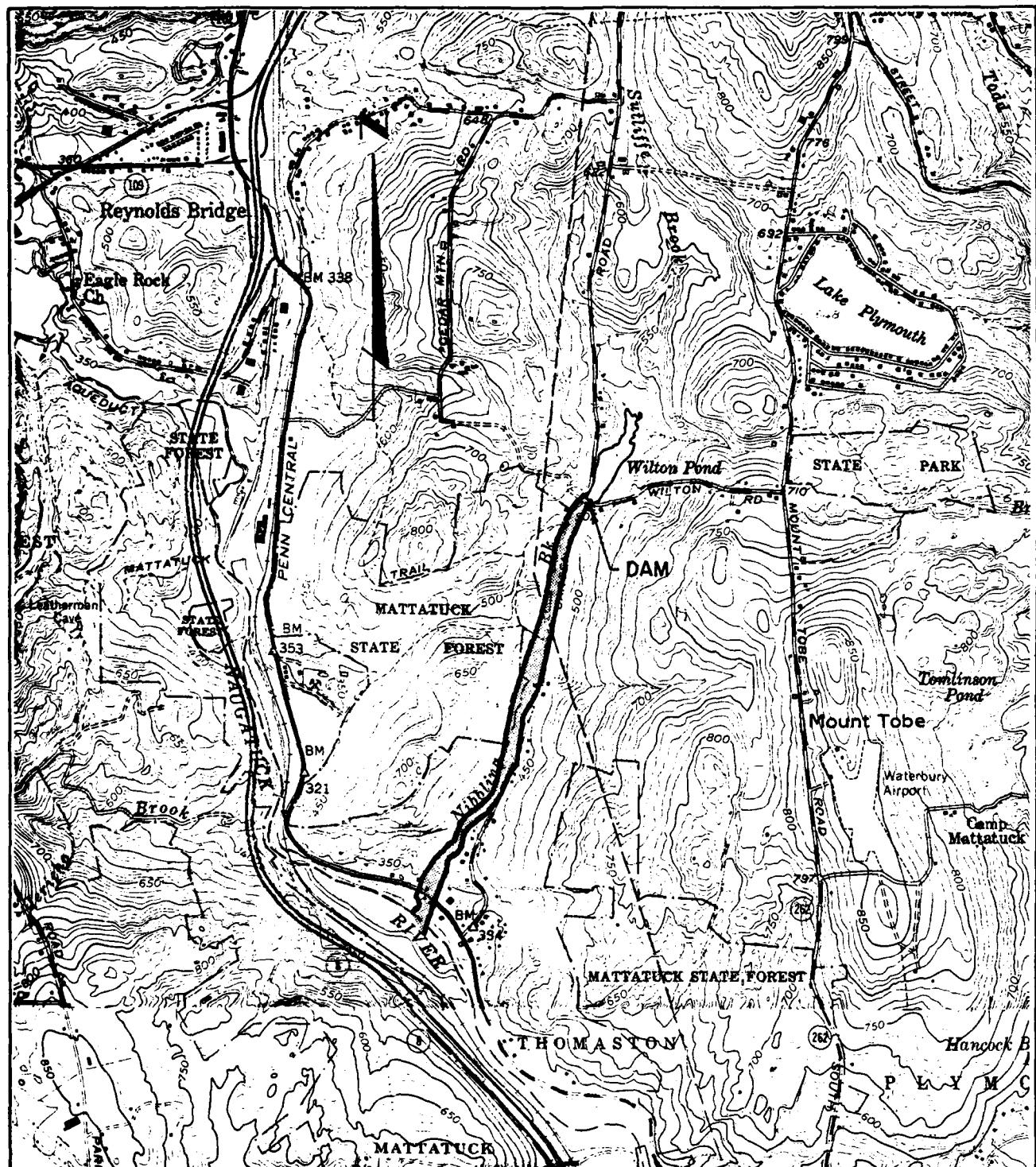
BASE FLOW = 356 CFS BASE STAGE = 328.2 FT.



WILTON POND DAM
DRAINAGE MAP
PLYMOUTH, CONNECTICUT

SCALE IN FEET

2000 1000 0. 2000



■ IMPACT AREA
 SCALE IN FEET
 2000 1000 0 2000

WILTON POND DAM
DAM FAILURE ANALYSIS
IMPACT AREAS
 PLYMOUTH, CONNECTICUT

FLAHERTY • GIAVARA ASSOCIATES, P.C.

D-18

APPENDIX E

INFORMATION AS CONTAINED IN THE
NATIONAL INVENTORY OF DAMS

AD-A144 678

NATIONAL PROGRAM FOR INSPECTION OF NON-FEDERAL DAMS
WILTON POND DAM (CT 0. (U) CORPS OF ENGINEERS WALTHAM
MA NEW ENGLAND DIV FEB 80

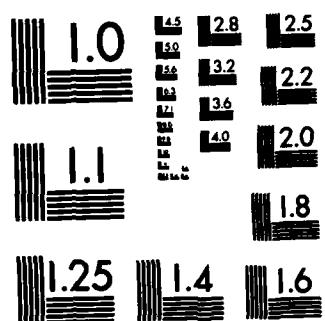
2/2

UNCLASSIFIED

F/G 13/13

NL





MICROCOPY RESOLUTION TEST CHART
NATIONAL BUREAU OF STANDARDS-1963-A

NOT AVAILABLE AT THIS TIME

END

FILMED

9-84

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